PROFILE ANALYSIS OF THE PERSONALITY ASSESSMENT INVENTORY-ADOLESENCE (PAI-A) FOR INDIVIDUALS WITH AUTISM SPECTRUM DISORDER

A DISSERTATION

SUBMITTED TO THE GRADUATE SCHOOL

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

FOR THE DEGREE

DOCTOR OF PHILOSOPHY

BY

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DECEMBER 2017

ACKNOWLEDGMENTS

I would like to thank the many people who helped me to complete this dissertation, who provided support and encouragement from start to finish. This journey has been better for them and I would not have accomplished so much without them.

I would like to extend my heartfelt thank you to my committee members: Dr. David McIntosh, Dr. Susan Wilczynski, Dr. Holmes Finch, and Dr. Michael Tagler. I greatly appreciate the constructive feedback and assistance they have provided to guide me through this process. Their support and encouragement has helped me to carry on throughout the process. I would like to give a special thanks to Dr. McIntosh, whose guidance and counsel has helped me to achieve goals and succeed despite the challenges presented to me. I am very grateful for Dr. McIntosh's mentorship as I grew into the psychologist I am today.

I also want to thank my friends and family for all of their love and support during my many years studying and writing. Whenever I was in need, I always had a shoulder to lean on. I am very grateful to my mother, father, and sister, who always believed in me and gave me all the love and support I could ask for. I am also grateful for my husband's support, who was always able to brighten my spirits, despite myself.

DEDICATION

To my father, Howard Hooks

No one has ever been so proud of me, nor ever will be!

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

Introduction

In this chapter, autism spectrum disorder (ASD) is briefly introduced. The assessments of autism, as well as the use of personality assessments are discussed, providing support for the current study. In addition, the purpose of the present study is discussed including the research questions. Finally, the significance of the proposed study is examined.

Autism spectrum disorder (ASD) is a pervasive developmental disorder with deficits in verbal and non-verbal communication, social interactions, and restricted, repetitive patterns of behavior, interests, or activities (American Psychological Association [APA], 2013). The Diagnostic and Statistical Manual of Mental Disorders (5th ed.; DSM-5; APA, 2013) provides two core symptoms: deficits in social communication and social interactions, such as non-verbal communication, metaphorical language, emotional regulation, understanding other's mental states, and understanding the rules of various social environments (Peterson, Wellman, & Slaughter, 2012), and restricted and repetitive behaviors and interests, such as self-stimulation or highly restricted interests. Rather than an umbrella term that includes several individual disorders, autism spectrum disorder represents a continuum of functioning and symptoms. The DSM-5 includes three levels of severity and adaptive functioning, ranging from requiring very substantial support to requiring some support.

Adolescents with ASD have difficulties unique to their stage in development compared to their typically developed peers that may lead to an increase in comorbid disorders. For example, during adolescence, social relationships become more important than family relationships, and more complex. Furthermore, adolescent friendships are qualitatively different from childhood friendships and require individuals to have a deeper emotional connection (Brendgen, Markiewicz, Doyle, & Bukowski, 2001), which is often more difficult for individuals with ASD compared to typically developed adolescents. As a result, individuals with ASD often become anxious about behaving inappropriately in novel social interactions (White et al., 2010), which become increasingly frequent. Because of this difficulty, individuals with ASD are more likely to experience loneliness and social isolation (Lasgaard, Nielsen, Eriksen, & Goossens, 2010). As a result of the social isolation and loneliness, individuals with ASD are more likely to have comorbid disorders, which often become apparent in late childhood and early adolescence (Gadow, Guttmann-Steinmetz, Rieffe, & Devincent, 2012; Joshi et al., 2013; Leyfer et al., 2006; Mattila et al., 2010). Mood disorders such as anxiety, social phobia, and depression are especially common among individuals with ASD, with approximately 26% of individuals with ASD between the ages of 2 to 18 experiencing comorbid mood disorders (Ming, Brimacombe, Chaaban, Zimmerman-Bier, & Wagner, 2008; Naglieri & Chambers, 2009). Identifying comorbidity may be difficult because individuals with ASD may present differently or symptoms may be masked by autism symptoms (Park, Park, Kim, & Yoo, 2012). Additionally, many individuals with ASD experience symptoms of anxiety and depression, which often present during late childhood or early adolescence, well after an initial diagnosis (Ming et al., 2008). Therefore, it is important for clinicians to have reliable and valid diagnostic tools to help diagnose comorbid psychiatric disorders, such as anxiety and depression. The purpose of the

current study is to determine whether the PAI-A can be used as a diagnostic tool to identify a personality profile for individuals with ASD and to help identify comorbid symptoms in adolescents with ASD.

Assessment of Autism Spectrum Disorder

Assessment during adolescence fulfills different purposes than childhood assessment. Because the majority of individuals with ASD are diagnosed between ages 5 and 7 (Centers for Disease Control and Prevention [CDC], 2014), most adolescent assessments are re-evaluations to assess progress and transitioning to adult life. Adolescents with ASD begin planning for life transitions, which often include school-to-work, college, vocational school, or a residential treatment facility. Some individuals who have ASD are not diagnosed in childhood (Shea & Mesibov, 2009). These individuals are often referred for an evaluation during adolescence for a seemingly unrelated issue (e.g., depression, anxiety, addiction, etc.), but their mood symptoms are often secondary to a diagnosis of an ASD. For example, some individuals with ASD may have difficulty making friends at school, and misbehave as a result. Others may experience anxiety or depression due to difficulty relating to their peers and maintaining friendships (Gadow et al., 2012; Strang et al., 2012). In these situations, it is vital to provide an accurate differential diagnosis and to distinguish between primary and secondary symptoms. Furthermore, individuals who are not diagnosed in childhood may have been high functioning enough to have had minimal difficulties in elementary school, but navigating the social landscape of middle school may prove challenging, and only then would symptoms be noticeable enough for a parent or teacher to recommend an evaluation (Shea & Mesibov, 2009).

Evaluations for adolescents with ASD may overlook symptoms of comorbidity. During these assessments, a multitude of variables are assessed, including intelligence, adaptive

functioning, personality, language, and symptoms related to autism; however, there are not many tools designed specifically for assessing comorbidity in individuals with ASD. This presents several problems in regards to making a differential diagnosis. Although there are many measures to identify mood disorders in typically developing individuals, many of these measures have not been standardized with individuals with ASD (Naglieri & Chambers, 2009). Furthermore, many autism measures are parent or teacher report scales, rather than gathering information from the client. Although gathering historical and clinical information from adolescents with ASD can be difficult, it is important to involve them in the evaluation process. Specifically, it is important for them to be involved in the evaluation process and begin to take increasing responsibility for their own advocacy and treatment planning.

Another issue when using measures normed with other clinical populations is that various psychological disorders may present differently for individuals with ASD. For example, individuals with ASD my present different profiles on measures of personality compared to other clinical populations. Therefore, it is important for clinicians to have measures specifically normed on a sample of individuals with ASD (Deprey & Ozonoff, 2009). One of the main reasons for including individuals with ASD within normative samples is due to possible differences in symptom manifestation. In some instances, individuals with ASD, who also are displaying behavior or mood disorders may hide or mask symptoms of autism; thus, preventing an accurate diagnosis of autism. However, some symptoms of autism may alter the manifestation of symptoms of mood disorders. With all these challenges for accurate comorbid diagnosis, it is even more important for clinicians to be aware and have measures specifically designed to identify comorbidity in individuals with ASD.

Personality Assessment

Personality measures are often used to assess constructs, such as anxiety and depression, in typically developing individuals and clinical populations (e.g., individuals with depression, anxiety, and personality disorders). However, there are no personality measures that have been developed specifically assess the personality and/or psychopathology in individuals with ASD. Although there has been limited research exploring the construct validity of personality measures when used with individuals with ASD, there have been several studies which have used personality assessments to identify symptoms of mood disorders and personality profiles in individuals with ASD (De Pauw, Mervielde, Van Leeuwen, & De Clercq, 2011; Fortenberry, Grist, & McCord, 2011; Ozonoff, Garcia, Clark, & Lainhart, 2005; Schriber, Robins, & Solomon, 2014).

Personality Assessment Inventory – Adolescent

The Personality Assessment Inventory-Adolescent (PAI-A) assesses for several clinical constructs that can be used to help diagnose personality disorders and other common symptomology associated with a variety of psychological disorders, such as anxiety, social phobia, obsessive-compulsive disorder, and depression. Furthermore, the PAI-A is a practical tool for clinicians to use, as it is a brief, yet thorough, and has a lower reading level than other personality assessment measures. This is particularly appealing for use with individuals with ASD, who may have poor reading comprehension skills. Research on the use of this measure to diagnose ASD could prove beneficial to identifying high functioning individuals with ASD. Despite the potential utility of the PAI-A, there is no norming sample for individuals with ASD or profile to distinguish ASD from other disorders. The PAI-A can potentially provide clinicians with data regarding common clinical profiles for individuals with ASD, as well as a way to

differentially diagnose ASD from other disorders and diagnose comorbid disorders for individuals with ASD.

Conclusion

Adolescents with ASD are evaluated for various reasons that are unique to the stage of development. Some individuals with ASD struggle with social interactions and experience a high rate of comorbidity with such disorders as anxiety, depression, and social phobia, in part due to being exposed to more complex social interactions as they reach middle school and high school. Still other adolescents are undiagnosed, but exhibit symptoms related to other disorders and are diagnosed at that time. Regardless of the reason for evaluation, adolescents experience novel difficulties, specific to this stage in development, that increase their risk for other psychological disorders, and therefore, they should be evaluated for comorbidity to help provide information to guide treatment goals and transition planning. To determine whether an adolescent with ASD has comorbid diagnoses, it is important to have valid and reliable assessment tools that can be utilized to identify symptoms of ASD for adolescents as well as comorbid symptoms. The PAI-A is a valid and reliable assessment tool that may be practical for clinicians to use with adolescents with ASD. The PAI-A is already commonly used to guide treatment goals and aid in assessment for a variety of other psychological disorders, but it has not been used with adolescents with ASD. Therefore, the current study will examine whether adolescents with ASD demonstrate unique PAI-A profiles compared to their typically developed peers and to the PAI-A clinical normative sample.

Purpose of the Present Study

Assessment of comorbidity among adolescents with ASD is difficult because symptoms of autism often affect the presentation of comorbid disorders . Furthermore, there are few, if any,

measures that have been specifically designed to diagnose comorbid disorders in individuals with ASD (Naglieri & Chambers, 2009). In general, personality measures are commonly used to help clinicians diagnose individuals with a variety of psychological disorders. Psychologists often include these general measures of personality when assessing for comorbid conditions in individuals with ASD. However, the inclusion of general measures of personality without considering the psychometric characteristics of the measures and the influence of the ASD symptomology when interpreting results can often lead to a misdiagnosis (Naglieri & Chambers, 2009). The majority of published personality measures do not include individuals with ASD within their standardization samples and have not explored whether the there is a specific pattern of responding for individuals with ASD that would lead to significant differences in personality (e.g., introversion, thought disorder, anxiety, etc.). For example, it seems plausible that individuals with ASD would interpret and respond to certain items (e.g., Do you see things that other people do not see?) on personality measures quite differently compared to other clinical populations. Therefore, it is possible the construct validity of personality measures my change when completed by individuals with ASD. Due to a lack of research exploring the personality profiles of individuals with ASD (Ozonoff et al., 2005), the purpose of this study was to conduct a profile analysis, using the PAI-A, to determine if there are differences in individuals with ASD compared to a community and clinical samples.

To answer this question, the PAI-A was administered to a group of adolescents with ASD and compared to the standardization samples (i.e., community and clinical samples) for the PAI-A. The results were analyzed to determine whether adolescents with ASD have significantly different profiles on the PAI-A's scales, providing clinicians with data regarding individuals with ASD. The purpose of this study is twofold:

1. When conducting a profile analysis of the PAI-A clinical scales:
    a. Do individuals with ASD display the same pattern of highs and lows (Parallelism Test) across the clinical scales as the community sample group?
    b. Do individuals with ASD display the same pattern of highs and lows (Parallelism Test) across the clinical scales as the clinical group?
2. Regardless of whether the profiles are parallel:
    a. Does the ASD group, on average score higher or lower (Levels Test) across the PAI-A clinical scales compared to the community sample group?
    b. Does the ASD group, on average score higher or lower (Levels Test) across the PAI-A clinical scales compared to the clinical sample group?

Significance of the Study

There are few studies that have used personality measures to assess autism, even though personality assessment is a common diagnostic tool for a variety of mental health disorders. Personality assessments have been utilized for diagnosis, treatment planning, as well as predicting recidivism among juvenile offenders (Ruiz, Cox, Magyar, & Edens, 2014). The utility of these measures has been well documented, but these self-assessment measures have not been utilized with individuals with ASD. Past research suggested individuals with ASD were not able to complete self-report measures accurately, but Schriber et al. (2014) demonstrated individuals with ASD were able to complete self-report measures with accurate analyses. The PAI-A has a 4^{th} grade reading level, lower than other personality assessments, making it ideal for individuals with ASD, who may have difficulty with reading and comprehension skills (Nation, Clarke, Wright, & Williams, 2006). To further the research on the utility of self-report personality assessments with individuals with ASD, the current study will look specifically at the PAI-A.

Additionally, there are minimal diagnostic tools designed to differentially diagnose comorbid disorders in individuals with ASD. Most assessments do not take the symptoms of autism into consideration, even though symptoms of autism affect the presentation of various mood disorders (Gadow et al., 2012; Mattila et al., 2010). This often leads to inaccurate diagnosis, and therefore treatment, for various metal health concerns. Furthermore, high functioning individuals with ASD often have milder symptoms and may be undiagnosed, or misdiagnosed. Reliable and valid comorbid assessment measures need to be researched in order for practitioners to identify individuals with ASD, as well as potential comorbid diagnoses. If the hypothesis is supported, the PAI-A could be used to differentially diagnose individuals with ASD, comorbid disorders, and other behavioral or mood disorders.

The PAI-A may be able to provide clinicians with a typical personality profile that could be a more sensitive measure for high-functioning individuals with ASD. Current measures easily identify individuals who exhibit clear signs of autism, but high-functioning individuals may not be correctly identified. Some may have learned how to fit in, while others may simply be very shy, whose symptoms may be going unnoticed by adults. Measures that gather information on the individual's thoughts, beliefs and values may be better at identifying high-functioning individuals. By researching personality profiles common for individuals with ASD as well as common comorbid diagnoses, clinicians may be able to better differentially diagnose adolescents with high-functioning autism.

CHAPTER II

Review of the Literature

This chapter provides a review of the literature, relevant to the current study. The first section discusses autism spectrum disorders (ASD), including a brief history of autism, current conceptualization of autism, and symptomology associated with ASD. Additionally, the chapter details the assessment of individuals with autism, specifically addressing best practices, the assessment of adolescents, and difficulties in assessment. Furthermore, this chapter includes information on personality assessments, specifically the PAI-A, and their potential utility in the diagnosis of autism spectrum disorder.

Autism Spectrum Disorder

Past Conceptualizations

Autism spectrum disorder has primary deficits in social interaction, communication, and restricted, repetitive, behaviors and interests; however, over time, there has been disagreement regarding whom exactly meets the aforementioned criteria and whether autism is a spectrum or a grouping of individual disorders. Although currently understood as a spectrum disorder, autism was originally a singular disorder, first noticed by Kanner (1943). Eventually, it became an umbrella term that encompassed several disorders, including autism disorder, Asperger syndrome, and pervasive developmental disorder not otherwise specified (PDD-NOS).

The term autistic was first used to described individuals with autism in 1943, in an article by Leo Kanner, which was titled, "Autistic Disturbances of Affective Contact." From the Greek words for self (*autos*) and a suffix for state or action (*ismos*), autism was an apt description of these individuals, as the children in the study appeared to have no interest in others and seemed to retreat into their own fantasy worlds (Goldstein & Ozonoff, 2009, p. 2). Kanner (1943) found several commonalities among 11 children, including the inability to relate to others and deficits in communication. All of the children had language deficits, and some were mute. Kanner noted odd cognitive patterns, such as their difficulty with abstract comprehension, and the ease at which they performed rote memory tasks. He surmised that they were cognitively average, but simply had no motivation to perform for others. Since Kanner's original description, studies have varied on their findings, reporting a range from 60 to 100% of participants with intellectual disabilities, with higher functioning individuals having less impairment. These higher functioning individuals with ASD were first reported by Hans Asperger, who coined the term autistic psychosis in his description of several individuals who exhibited similar behaviors as individuals with Kanner's autism (Frith, 1991). The individuals described by Asperger were different in that they used more mature, complex language than their peers. He also described them as having deficits in forming appropriate relationships with people and objects, as the individuals he observed often only bonded with one or two individuals, had deficits in non-verbal communication, and were often clumsy when interacting with objects (Asperger, 1991). Autistic psychopathy eventually became known as Asperger syndrome and was categorized as a pervasive developmental disorder in the DSM-IV, alongside autistic disorder (Fombonne, 2005).

Although Kanner's original paper was published in 1943, it was not until the third edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-III; APA, 1980)that autism

was classified as a separate disorder. In the first and second editions of the DSM, this condition was categorized as an early form of schizophrenia, called schizophrenic reaction of childhood type in the first edition, then renamed Schizophrenia, childhood type in the second edition. The third edition added a new category of disorders, called pervasive developmental disorders, which included infantile autism. One of the most notable aspects of the DSM-III diagnostic criteria was the age of onset. In the DSM-III, symptoms for infantile autism should be detected before 30 months of age, a very young cut-off date, which meant individuals with less severe symptoms were undiagnosed (APA, 1980). The cut-off was revised in the DSM-III-R, from 30 months to "early childhood," which allowed more flexibility in diagnosis. Additionally, the "infantile" part of "infantile autism" was dropped to simply autistic disorder, as the disorder began to be conceptualized as a developmental disability rather than a childhood disorder.

The change in the age of onset prompted rates of diagnosis to increase. In the early 70's, rates of autism were estimated to be 1 in 2,500 children in several European studies, but after the introduction of autism into the DSM-III, rates began to increase. By 2000, prevalence estimates were 1 in 150, and the latest report in 2014 estimates 1 in 68 children have autism (Volkmar, Bregman, Cohen, & Cicchetti, 1988). While the exact rise of autism is unknown, it appears there is not an actual increase in incident, rather an increase in awareness (CDC, 2014). It is likely changes in diagnostic criteria, such as age of onset, as well as changes in policies for special education and availability of services affected the rate of prevalence in autism (Fombonee, 2009; Fombonne, 2005).

Our understanding of ASD has drastically changed since Kanner's initial article, and with the increased recognition of individuals with ASD, prevalence rates have drastically increased. With the addition of autism in the DSM-III, there was an increase in research on autism, which

provided more accurate diagnostic criteria and advances in diagnostic measures. As a result, the ability to identify individuals with ASD has become more accurate, increasing prevalence rates.

Current Conceptualization

DMS-IV and DSM-IV-TR criteria. The DSM-IV (APA, 1994) has dominated our current conceptualization of autism spectrum disorders for nearly two decades. Classified under pervasive developmental disorders, the DSM-IV included autistic disorder, Asperger syndrome, childhood disintegrative disorder (CDD), Rett's disorder, and pervasive developmental disorder-not otherwise specified. Autistic disorder had three main diagnostic criteria in both the DSM-IV and the DSM-IV-TR (APA, 2000). First, there was a qualitative impairment in social interactions, such as impairment in non-verbal communication, developing peer relationships, showing interest in other people, and emotional and social reciprocity. The next main criterion was impairment in communication, demonstrated by a delay in spoken language, difficulty initiating and maintaining conversations, and lack of age-appropriate play. The final criterion was a restricted repetitive and stereotype pattern of behaviors, interest, and activities, such as preoccupation with a particular pattern of interests, an inflexible adherence to specific non-functional routines, stereotyped repetitive motor mannerisms, and persistent preoccupation with parts of objects. The DSM-IV was the first edition to include Asperger syndrome, originally autistic psychosis. Based on the description provided by Asperger (1991), the diagnostic criteria included impairment in social interactions, and a restricted, repetitive and stereotyped pattern of behavior, interests and activities. These symptoms described by the first two diagnostic criteria are identical to those described in autistic disorder; the main difference between the two disorders is the delay in language. Another differentiation was a lack of cognitive impairment, originally noted in Asperger's 1943 article (Frith, 1991, p. 12).

Eventually, more research lead to the idea that the two disorders are more similar than different, and a continuum, rather than an umbrella term, was more appropriate. A diagnoses of Asperger syndrome, autism disorder, or PDD-NOS was more dependent on individual practitioners, rather than a strict set of diagnostic criteria (APA, 2000) and even brain scans, analyzing EEG coherence, which found differences between typically developing individuals and individuals with ASD, could not differentiate between individuals with Asperger syndrome and individuals with high functioning autism (Tryon, Mayes, Rhodes, & Waldo, 2006). The 5th edition of the DSM (APA, 2013) combined Autistic disorder, Asperger syndrome, and PDD-NOS into autism spectrum disorder, while Rett disorder and CDD were removed.

DSM-5 criteria. In the 5th edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; APA, 2013) made several significant changes to the disorders in the pervasive developmental disorder category. Autism spectrum disorder replaced the four previous disorders (i.e., autism disorder, Asperger syndrome, childhood disintegrative disorder, and PDD-NOS). This new classification system discarded the previous classification system and created different levels of functioning, ranging from individuals who need minimal support to those who need substantial support. Moreover, the DSM-5 combined two of the main diagnostic criteria from the DSM-IV: deficits in communication and deficits in social interaction. Another change made to the diagnostic criteria was the age of onset. With the new diagnostic criteria, symptoms only need to be present in early life, not necessarily by age 3. These changes allow for individuals whose symptoms are not fully identified until later in life (Hyman, 2013).

The first diagnostic criterion for ASD in the DSM-5 (2013) is persistent deficits in social communication and interaction. These include deficits in social-emotional reciprocity, nonverbal communicative behaviors, and developing, maintaining, and understanding relationship. This

social skills deficit is perhaps the most characteristic of ASD and includes a wide variety of skill sets, including non-verbal communication, metaphorical language (i.e., sarcasm, metaphors, irony;), emotional regulation, understanding other's mental states, and understanding the rules of various social environments (Peterson et al., 2012). The second main criterion for the diagnosis of ASD is a restricted, repetitive pattern of behavior, interest, or activities. These include behaviors such as stereotyped or repetitive motor movements, cognitive inflexibility, highly restricted, fixated interests, and hyperactivity to sensory input (APA, 2013).

Despite the change in conceptualization, the diagnostic criteria in the DSM-IV and DSM-5 still have three common areas of deficits: social interaction, communication, and a restricted, repetitive pattern of behavior, interest, or activities. The biggest changes between the two are in regards to integrating the disorders encompassed under the umbrella term of autism into one spectrum disorder. In addition, the diagnostic criteria for social and communication deficits were combined into one diagnostic criterion, emphasizing the entanglement between communication and social skills. Most people who were diagnosed under the DSM-IV criteria are also diagnosed with ASD under the DSM-5 criteria, with the exception of individuals diagnosed with PDD-NOS, who are under diagnosed (Mayes et al., 2013). Overall, the two sets of criteria are similar enough to suggest that those who were diagnosed under DSM-IV criteria would also be diagnosed under the DSM-5 criteria for ASD.

Autism During Adolescence

Adolescence is a time of change, and this is no different for individuals with ASD. Puberty begins during this time, producing a wide variety of hormonal changes that affect behaviors for typical children, but especially affect the behavior of individuals with ASD. After puberty, adolescents have a higher rate of mood disorders, (APA, 2013), which is even more

profound for adolescents with ASD. The increase in mood disorders is, in part, due to hormonal changes, but also due to changes in social relationships. Repetitive and restricted behaviors generally decrease while social skills tend to improve over time (Blakemore, 2008), making social relationships easier to form, but the social environment changes as well, providing novel social situations that can increase rates of social anxiety. It is this combination of biological and environmental changes that leads to an increased rate of comorbid mood disorders for adolescents with ASD.

Sexual Maturation and Autism Spectrum Disorder

Puberty typically begins during early adolescence and brings a host of biological changes, the most important of which is sexual maturation. For males, the onset begins slightly later on average with the development of primary sex characteristics (i.e., penis, scrotum, prostate gland, and seminal vesicles), and spermarche, the first ejaculation, about one year later. For females, sexual maturation begins with menarche, the onset of menstruation, at an average age of 12 (Sloboda, Hart, Doherty, Pennell, & Hickey, 2007). What normally occurs for typically developing adolescents does not necessarily translate to adolescents with ASD. Despite the potential differences in development, few articles have examined the puberty for adolescents with ASD. Whitehouse, Maybery, Hickey, and Sloboda (2011) conducted one of the few studies examining female adolescents with ASD and puberty. Adolescent females were assessed at age 2 for autistic-like traits based on the pervasive developmental Problems (PDP) scale and categorized into three groups: a high, medium, and low level of autistic traits. The study yielded significant results, indicating those who had a higher level of autistic-like traits at age 2 had a latter age at menarche (AAM), than those with typical or low levels of autistic-like traits.

While there is limited research on the biological differences occurring during puberty, the daily experiences of adolescent females were examined. Cridland, Jones, Caputi, and Magee (2014) interviewed several adolescent females with ASD and their parents to provide a fuller picture of what adolescence was like for these individuals. Parents of females were initially anxious about explaining menarche to their daughters, but found it quite easy to provide their daughters with information on what their bodies were doing. The daughters often wanted to know the facts about what changes were happening to their body, and without the social taboos surrounding menstruation, conversations were quite open and honest.

One area receiving recent attention is sexual maturity in adolescents with ASD. Adolescents with ASD are often considered sexually immature, despite their physical development. To the contrary, adolescents exhibit similar levels of interest in dating, romantic relationships, and sex as their typically developing peers (Hénault & Attwood (2002). Due to this perception, adolescents with ASD are often not provided with sexual education unless there is a prior history of sexual abuse, or inappropriate sexual activity occurring (e.g.,, public masturbation), which is common due to deficits in understanding social rules and differentiating public and private behavior (Ballan, 2012). Although adolescents with ASD are not receiving formal sexual education, parents are often concerned about their child's progression through puberty. Ballan (2012) interviewed a group of parents to determine common concerns regarding the onset of puberty. One common area of concern was other people misinterpreting their child's non-sexual behaviors (i.e., hugging, touching others,). Parents also had problems finding health professionals, such as school nurses, to assist them in providing sexual education to their child. Health professionals seemed embarrassed and referred them to a behavior specialist, rather than providing sex education. Furthermore, while some parents were concerned about potential sexual

abuse, other parents had not considered their child's sexual development, as they were preoccupied with other demands of caring for a child with a pervasive developmental disability.

Overall, the lack of research, resources, and awareness indicate sexual development for ASD needs more attention in the literature. While there appears to be some evidence of differences in sexual maturation, there is insufficient evidence to indicate whether individuals with ASD experience differences in adolescent development. While the physical development has not been addressed, sexual education has been receiving attention recently, demonstrating the need for more sexual education provided to adolescents with ASD, and assistance for parents, as well.

Social Competence and Friendships during Adolescence

In addition to puberty, there are changes in symptom manifestation and the social environment. Individuals with ASD often receive interventions for basic social skills during childhood (Koegel, Vernon, & Koegel, 2009; Pierce & Schreibman, 1995; C. Whalen, Schreibman, & Ingersoll, 2006), but adolescent social skills groups are rare. Therefore, adolescents with ASD are often not prepared to handle new social challenges in their environment. Adolescents with ASD do tend to improve their social skills over time, at least in part due to early intervention, but adolescents with ASD still have difficulty initiating and maintaining friendships, resulting in social isolation and loneliness. As a result of their lack of social competence, adolescents with ASD are more likely to have a comorbid mood disorder (Esbensen, Seltzer, Lam, & Bodfish, 2009).

Social Competence. Social competence is described as having the capability to establish and maintain positive, appropriate interpersonal relationships (Blakemore, 2008). It includes a wide range of skills from appropriate social greetings to maintaining friendships. There is no

unifying model of what skills sets are included in social competence (Gresham, Sugai, & Horner, 2001), but there is a general agreement that social skills, social perception, and social cognition is needed for social competence (Romanczyk, White, & Gillis, 2005).

Specific social skills. Social skills can be defined in a variety of ways. Plavnick, Sam, Hume, and Odom (2013) defined it as behaviors consisting of an isolated response to a specific stimulus. Gresham et al. (Walton & Ingersoll, 2013) defined it as specific behaviors that an individual uses to competently perform social tasks. Regardless of how precise the definition is, many skills have been identified as targets for interventions and range from basic skills, such as joint attention and eye contact to complex social skills, like having a conversation (Pierce & Schreibman, 1995). Most of these social skills are taught during childhood, leaving more adolescents without help navigating a more complex social world.

There is also a dichotomy between positive and negative social behaviors (Gresham et al., 2001). Positive behaviors are social skills that indicate social interest, leading to appropriate social interactions. Interventions have targeted a long list of positive social skills in individuals with ASD, including: initiating interactions (Paclawskyj, Rush, Matson, & Cherry, 1999), sharing enjoyment (Bass & Mulick, 2007), joint attention, eye contact (Christina Whalen & Schreibman, 2003), complexity and diversity of verbal language (Hancock & Kaiser, 2002), imitation (Ingersoll, Walton, Carlsen, & Hamlin, 2013), social initiations and conversations (Gaylord-Ross, Haring, Breen, & Pitts-Conway, 1984) and nonverbal dyadic orienting and self-initiated social engagement (Koegel et al., 2009).

Negative behaviors, also called problem behaviors (DeMatteo, Arter, Sworen-Parise, Fasciana, & Paulhamus, 2012), hinder appropriate social interactions and prevent successful acquisition of social skills, such as self-stimulation, aggression, or non-compliance. Many of

these negative behaviors also can be categorized as restricted, repetitive behaviors and interests (RRBI's), another core feature of autism. RRBI's include a wide range of behaviors, from repetitive movements to more cognitive symptoms (Gena, 2006). These RRBI's often prevent individuals from forming typical, adolescent friendships and also interfere with receiving positive feedback for social skills they do have. While social skills often tend to increase over time, research shows mixed results on whether RRBI's decrease or remain constant throughout development (South, Ozonoff, & McMahon, 2005).

Social Perception. Individuals with ASD have difficulty perceiving their environment, and even more difficulty attending to social information (Elison, Sasson, Turner-Brown, Dichter, & Bodfish, 2012). Individuals with ASD often miss important social clues, hampering their ability to interpret social information and apply appropriate social skills to situations. Social scanning abilities are weaker in young children with ASD compared to typically developing peers. Furthermore, this initial deficit grows at a slower pace than typically developing individuals, creating an even larger gap in adolescence (Elison et al., 2012).

Social cognition. Rather than focusing on specific social skills, social cognition may provide a better solution to determining specific social deficits in individuals with ASD. According to (Lewis & Bodfish, 1998), deficits in social skills are linked to difficulties with social cogitation, the inability to perceive and interpret small events in the environment causes many of the difficulties in social interactions for individuals with ASD (Loveland, Pearson, Tunali-Kotoski, Ortegon, & Gibbs, 2001). Social cognitive deficits include the initiation of communication, listening and processing subtle sensitive cues, abstract and inferential thinking, understanding the perceptions of others, gestalt processing, and humor (Garcia Winner, 2002).

Individuals with ASD have been shown to have deficits in Theory of Mind, which is related to their social cognition. Theory of Mind (ToM) is the ability to understand that human behavior stems from beliefs, opinions, and other mental states rather than from objective reality (Garcia Winner, 2002; Peterson et al., 2012). These are divided into lower order tasks and higher order tasks. Lower order tasks, such as basic false beliefs tasks or hidden-emotions, develop by age 3 and are less complex than higher order tasks, like interpreting the speaker's communicative intent (i.e., using irony, humor) or taking multiple perspectives into consideration (Peterson et al., 2012). ToM typically develops during childhood; however, individuals with ASD often do not fully develop these skills, even in adulthood (Peterson et al., 2012). For individuals with ASD, difficulties in understanding the influence of emotions on people's behaviors, adjusting one's own behavior depending on the mental states of others, decoding social cues and adjusting behavior, and understanding false-beliefs (Baron-Cohen, Tager-Flusberg, & Cohen, 2000) have been found to impact their ability to understand sarcasm, irony and non-literal language, as well as explaining the behaviors of others (Peterson et al., 2012). However, their level of functioning often determines the type or amount of difficulty they have with these tasks. Wellman, Fang, and Peterson (2011) found individuals with Asperger syndrome scored significantly worse compared to typically developing peers, but scored better than individuals with autism. Of particular importance in this study was when language and age were controlled, the difference between the Asperger group and the autism group disappeared, indicating language ability may relate directly to their ability to perform ToM tasks.

Friendships during Adolescence. Social interactions and friendships become increasingly important and complex during adolescence (Peterson et al., 2012), making it an especially difficult point in the development for adolescents with ASD. In fact, adolescents with

ASD experience more loneliness and social isolation compared to typically developed peers, due to their deficits in initiating and maintaining friendships (Brendgen et al., 2001). Adolescent friendships place a greater importance on the quality of the relationship, emphasizing intimacy, mutual understanding, and loyalty (Lasgaard et al., 2010). Furthermore, these friendships are based on the quality, which is now more important that quantity. Rather than having a wide array of friends, adolescents typically have between four and six "best friends," which becomes fewer over time (Hartup & Stevens, 1999). The perceived quality of friendships affects which friendships they value most and impacts their behaviors towards their friends, such that positively perceived friendships will result in the individual engaging in more positive behavior toward their friend (Hartup & Stevens, 1999). This is particularly troubling for individuals with autism, who may engage in annoying behaviors, leading typically developing peers to regard the quality of their friendship poorly. This was further verified by (Brendgen et al., 2001), who found adolescents with ASD have a lower quality of life, in the areas of friendships, leisure activities, and affective and sexual relationships.

Although adolescents with ASD have difficulty with social interactions and relationship, it does not mean they are unaware of their difficulties or do not want social relationships. Cottenceau et al. (2012) reviewed several autobiographies of prominent individuals with ASD and coded their texts. They found two overarching themes: "(a) desiring connections, and (b) navigating the world of people" (p. 87). Individuals with ASD were well aware of their loneliness and expressed a desire to have social relationships. They also were aware that others found building relationship with them to be difficult, perhaps because of their difficulty understanding social rules. Several aspects of initiating and maintaining friendships were identified by individuals with ASD, specifically: "(a) the need for predictability, (b)

communication and social disorientation, (c) unconventional responses to sensory information, (d) intense interests and the work of being social, and (e) turning within, [or using] imagination as a substitute for interaction." For many individuals with ASD, friendships are desired, but there are too many barriers for individuals with ASD to build lasting friendships that are so characteristic of adolescence.

Not only do adolescents with ASD desire friendships, they may provide protective factors vital for healthy social-emotional development. Friendship has been shown to increase an individual's academic and emotional success in school and overall positive school adjustment (Causton-Theoharis, Ashby, and Cosier (2009). In fact, having just one best friend present during a negative event decreases the physiological stress response of the individual and increases global self-worth (Buhs & Ladd, 2001). Unfortunately, adolescents with ASD are more likely to be rejected by their peers and bullied by others. Without the protective factors, these events may lead to feelings of loneliness (Adams, Santo, & Bukowski, 2011), as well as school avoidance, underachievement, and negative school attitudes (Lasgaard et al., 2010).

Assessment of ASD in Adolescence

Assessing adolescents with ASD often has different functions, measures, and considerations than childhood evaluations. Initial evaluations often focus on differential diagnosis and identifying individuals not identified in childhood, such as high functioning individuals or individuals who have received a different diagnosis. Other evaluations may be related to adolescents' transition into adulthood, focusing on treatment planning, academic accommodations, or employment. Because the reasons for evaluation are different, there are some challenges when evaluating adolescents with ASD. These challenges could be in the form of a vague referral question, obtaining accurate background information or a history of

symptoms and treatments, or a lack of client participation. Furthermore, the identification of comorbid conditions is a focus of adolescent evaluations, as many individuals receiving evaluations often present with symptoms of other disorders, and possibly misdiagnosed in the past. It is, therefore, important not only to differentially diagnose other disorders, but also to determine if there are comorbid disorders present. Just as there are challenges in evaluating adolescents, there are challenges evaluating individuals with ASD, such as psychometric issues, self-report difficulties, and differences in symptom manifestation. Finally, personality assessments are discussed in relation to their use with adolescents with ASD, with special consideration to the PAI-A.

Identification and Diagnosis of ASDs with Adolescents

Comprehensive assessments for adolescents with ASD include a multi-method assessment that uses multiple measures, as well as interviews with parents or guardians and the individual. In fact, most valuable information is often gathered through structured or semi-structured interviews with family members and the client (Goldstein & Ozonoff, 2009). Interviews should not be used in isolation as it does not provide a standard to compare reported symptoms. Therefore, many standardized scales and assessment measures have been developed to assist in diagnosis, including assessments to evaluate cognitive ability, adaptive behaviors, language and communication abilities, social skills, and specific ASD symptoms. Full diagnostic batteries may also include assessments in neurological functioning, genetic testing, speech and hearing, and a sensory functioning.

Although the evaluations all involve similar parts, the reason for evaluations differs significantly for adolescents with ASD compared to children with ASD. Most individuals are diagnosed in childhood, so adolescents who are not identified in childhood are often higher

functioning, who may have been diagnosed. Therefore, initial evaluations focus on differential diagnosis or identifying individuals who were missed during childhood due to generational differences in diagnosis. For individuals diagnosed in childhood, re-evaluations are common in adolescents to help prepare them for their transition to adulthood. Re-evaluations may focus on creating an individualized treatment plan (ITP), updating treatment plans, determining eligibility for services and supports, or identifying comorbid diagnoses.

Initial Evaluation for Adolescents. Adolescent evaluations have a different focus than childhood evaluations. While most children are diagnosed in early childhood (Mazefsky & White, 2013), some individuals with ASD are not identified or were misidentified, in childhood. As a result, adolescent evaluations often focus on differential diagnosis. Moreover, some individuals were not diagnosed due to generational differences in diagnosis. As diagnostic criteria have changed, individuals who did not qualify in childhood may qualify under current diagnostic criteria.

Differential Diagnosis. One of the main concerns for adolescent evaluation is differential diagnosis, as individuals who are not diagnosed until adolescence may not exhibit classic signs of autism in childhood, or may exhibit symptoms of other disorders, leading to misdiagnoses (CDC, 2014). Inaccurate diagnoses may be received when individuals learn to hide their social difficulties, but exhibit other symptoms common among individuals with ASD, such as difficulty with emotional regulation or higher functioning social skills. Furthermore, comorbid symptoms, such as depression, anxiety, inattention, or maladaptive behaviors, may mask underlying symptoms of autism (Shea & Mesibov, 2009), leading to inaccurate diagnoses.

One common subset of individuals with autism, who are often undiagnosed, is females with high functioning autism spectrum disorder (HFASD). Males are nearly 5 times as likely to

be diagnosed with ASD (Mazefsky & White, 2013), and while much of the disparity is likely to be caused by biological etiology of autism (CDC, 2014), studies also have shown high functioning females with autism are less likely to be referred for an autism evaluation. Females are more likely to present with mood related symptoms (e.g., anxiety, depression,), whereas males are more likely to present with behavioral symptoms (i.e., aggression, opposition). Because females tend to have fewer disruptive symptoms that draw attention from adults than males, they are less likely to be referred for evaluation in general (Hartung & Widiger, 1998). Moreover, females who are referred for an evaluation are less likely to be correctly diagnosed, because assessment tools are standardized on mostly male samples, and do not take into account differences in presentation, such as a higher level of social skills compared to males, and more mood related symptoms, while overall autistic traits are similar (Dworzynski, Ronald, Bolton, & Happe, 2012). Furthermore, females included in standardization samples are more likely to have been identified based on symptoms more common among males than females, highlighting external behaviors rather than internalizing behaviors, making research on gender differences inherently flawed and perpetuating the under-diagnosis of females with HFASD (Constantino, 2011). The same issues are found when looking at studies that account for high functioning females with ASD. Kreiser and White (2014) reported the gender ratio was 1.11 to 2.45:1 at age 3, with an unexpectedly large percentage of girls with ASD falling in the high functioning range, further supporting the notion females with ASD are under diagnosed. Therefore, due to differences in symptom presentation, individuals are less likely to be referred and correctly identified as having HFASD in childhood.

Generational Differences in Diagnosis. Because of the changes in diagnostic criteria in the DSM, as well as the increased awareness and advances in research, adolescents who had not

been previously identified with ASD in childhood may be referred for evaluations in adolescence. The rise in prevalence rates over time is indicative of a change in diagnostic practices, leading more individuals to be accurately diagnosed (CDC, 2014). In fact, when using current criteria on older cohorts, studies have shown there is no upward trend in prevalence (Fombonee, 2009). This is a reasonable conclusion, considering the influx in research and awareness in the last decade. Even currently, there are limited professionals trained in the differential diagnosis of autism spectrum disorders, with disagreement among DSM-IV autism diagnoses (Lord, Petkova, Hus, & et al., 2012), and there were even fewer 10 – 20 years ago. Therefore, there are some individuals who are not diagnosed in childhood, but later referred for diagnosis in adolescence.

Re-Evaluations for Adolescents with ASD. Adolescents with ASD also may be re-evaluated before transitioning into adulthood. The purpose for re-evaluation can take several forms, including providing treatment, transition planning, eligibility for services and supports, or identifying for comorbid disorders.

Treatment Planning. An accurate diagnosis of ASD is necessary in order to provide appropriate treatment. Because of deficits in theory of mind, cognitive-behavioral treatments (CBT), which is a common evidence-based treatment used with adolescents, may not be appropriate for treatment. If adolescents are diagnosed inaccurately and underlying problems related to ASD go unnoticed, time that could be better spent providing evidence-based treatments for individuals will be spent providing ineffective treatments. Even for high-functioning individuals with ASD who may be better able to engage in CBT, typical CBT methods may need to be altered to address time needed to understand concepts, adding more visual cues and extra practice with peers, carefully matching skills training to areas of defects, and providing more

structure for each session (Matson, Kozlowski, Hattier, Horovitz, & Sipes, 2012). Therefore, accurate diagnosis is vital. Individuals with ASD often have deficits in theory of mind and may not have the self-regulation skills or the self-reflection skills needed to engage actively in CBT. They also may need various social skills to be explicitly taught, as they do not learn typical social skills through observing other children. Providing treatment to individuals with ASD is different than providing treatment to an individual with other comorbid diagnoses, even if the individual with ASD also has depression, because of the various deficits that come with ASD.

Individualized Transition Plan. As children develop, different supports and services are needed to prepare for adulthood (Shea & Mesibov, 2009). Therefore, adolescents with ASD are required by law to have an individualized transition plan (ITP) in place by their 16th birthday (IDEA, 2004), although it is recommended this process begin earlier, with a plan in place by age 14. A diagnosis of autism does not provide enough information for educational professionals to assist in developing treatment or accommodations for an individual with ASD. Transition plans should be student-centered, broad-based, and outline current and future goals with strategies to achieve them. For adolescents with ASD, transition plans may look very different. For example, some individuals may be living independently, but qualify for Medicaid or other publicly funded programs, supplemental security income, and vocational rehabilitation services. Others may wish to go to college, and may be able to receive modifications for college admissions tests. Regardless of the individual trajectory, it is important to re-evaluate individuals during this stage of development to provide information on the individual's strengths and weaknesses.

Eligibility for Supports and Services. Adolescents with ASD may be evaluated to determine eligibility for additional supports and services as they transition into adulthood. Differences in functioning can lead to a wide rage of outcomes for adolescents with ASD

(Burgress & Cimera, 2014). By being proactive and determining the functioning of individuals as they begin adulthood, they have the best opportunity to have their needs met without being in a restrictive environment. For lower functioning individuals, planning for residence in a residential facility may be the most beneficial, where as higher functioning individuals may require preparation for college admission. When preparing for adulthood, eligibility for public services and funds, living arrangements, and employment opportunities should be considered to ensure the client has the best quality of life possible (Shea & Mesibov, 2009). For example, some individuals may be living independently, but qualify for Medicaid or other publicly funded programs, supplemental security income, and vocational rehabilitation services. Others may wish to go to college, and may be able to receive modifications for college admissions tests. A diagnosis of autism does not provide enough information for educational professionals to assist in developing accommodations.

One area to consider when looking at eligibility for services is the client's level of independence and capacity to engage in self-advocacy. Self-advocacy goals should always be incorporated into ITP, such as identifying when help is needed, determining ways to obtain assistance, and learning to ask for help and seek supports (Myles, Smith, & Swanson, 2008). Self-advocacy is dependent on social and communication skills, which are difficult for individuals with ASD. Therefore, teachers, parents, and other professionals often need explicitly to teach self-advocacy skills to adolescents with ASD. By increasing self-advocacy skills of adolescents, they may have better long-term outcomes, such as more employment opportunities and more success for college enrollment. Therefore, it is necessary to evaluate self-advocacy skills during adolescence.

Identifying Comorbid Disorders. When conducting a re-evaluation for treatment planning purposes, it is important to consider comorbid mood disorders, which have a higher prevalence rate among children and adolescents with ASD compared to the general population (Mazurek & Kanne, 2010). Because children are diagnosed around 4 years, 5 months on average (Jones & Frederickson, 2010), comorbid symptoms may not present until after the initial diagnosis of autism. Furthermore, clinical expression of comorbid symptoms in individuals with ASD may range and look different from typically developing individuals, making comorbid diagnosis difficult (Deprey & Ozonoff, 2009). These comorbid disorders can affect the long-term outcomes for adolescents with ASD and should be taken into consideration during the transition planning process. Therefore, it is important for clinicians to be mindful of potential comorbid diagnoses as they could influence decisions regarding future treatment and transition planning.

Specific Challenges for ASD Evaluations

There are several challenges unique to assessing adolescents with ASD. Referral questions are not always clear, as there may be a broad array of concerns from parents, teachers, and physicians. Obtaining information about an individual also may be difficult, as measures are often made for children, and developmental histories may be forgotten by adolescence. These issues are problematic because a history of symptoms is needed for a diagnosis for ASD. Finally, there are also challenges with client participation.

Vague Referral Questions. Evaluations for adolescents with ASD can take a variety of focuses, making vague referral questions difficult to answer. When referred for an evaluation, questions from teachers, parents, or physicians may not be worded to maximize the benefit of a full psychological evaluation (Trammell, Wilczynski, Dale, & McIntosh, 2013). Vague questions, such as, “Do they have a mental illness?” do not provide the clinician with enough

information to tailor the assessment to fit the needs of the individual, wasting time and resources. Parents who are frustrated from coping with their children's behavioral, social, or academic difficulties may not have referral questions, but simply want answers about their children. However, identifying the reason for the evaluation will lead to a more productive evaluation (Shea & Mesibov, 2009).

Age Appropriate Measures. Clinicians have a limited set of tools to diagnose adolescents with ASD. There are some reliable and valid measurement instruments that can be administered to adolescents, such as the Autism Diagnostic Interview – Revised (ADI-R; Rutter, Le Couteur, & Lord, 2003), and the Autism Diagnostic Observation Schedule (2nd edition; ADOS-II; Lord et al., 2012), but administration requires training and is time consuming (Trammell et al., 2013). Commonly utilized measures for diagnosing children with ASD have psychometric issues when used with adolescents. The standardization sample for measures, such as the Childhood Autism Rating Scale (CARS; Schopler, Reichler, & Renner, 1988), often do not have a representative sample of adolescents in their standardization population (Naglieri & Chambers, 2009). In addition, many scales have a limited number of females in their standardization sample, which may underemphasize internal symptoms (Leyfer et al., 2006). Furthermore, some instruments were normed on typically developing individuals, rather than individuals with ASD (Deprey & Ozonoff, 2009). Because the target population was not included in these measures, they may not be generalizable for adolescents with ASD and should be interpreted with caution when using them with adolescents with ASD.

Obtaining accurate background data. When making a diagnosis of ASD, it is imperative accurate background data be collected. As part of the diagnostic criteria for ASD, there must be evidence of impairment during early childhood. Without that information, an accurate diagnosis

cannot be made. For instance, individuals who have been diagnosis with a psychotic disorder (i.e., schizophrenia) may have been misdiagnosed, interpreting symptoms of ASD for symptoms of psychosis (Nylander & Gillberg, 2001). It is, therefore, important for background information to be verified with a parent or caregiver, if possible. In addition, the current level of impairment, symptoms, and treatment history needs to be documented. Obtaining accurate information from adolescents with ASD is challenging, as individuals with ASD are more likely to diminish their deficits than typically developing individuals (Schriber et al., 2014). Moreover, obtaining information from adolescents with ASD is challenging due to deficits in social awareness, communication, theory of mind, information processing, and executive functioning (Zwaigenbaum et al., 2012). For example, adolescents with ASD may be unaware of being excluded from social activities due to deficits in social awareness. If an individual does not have the self-awareness to tell the clinician about their deficits in social skills, it is likely a different diagnosis will be made.

Challenges in Client Participation. When obtaining background information for childhood evaluations, the parents or caregivers often provide a wealth of information needed to accurately diagnose, but for adolescent evaluations, information regarding behavioral and emotional symptoms is needed in addition to background history. Difficulty with introspection among adolescents with ASD makes this task challenging. Information on current symptomology is best collected from the client in a multi-method, multi-informant evaluation, and without accurate information regarding current level of functioning, clinicians may not be able to gather enough data to make an accurate diagnosis.

For adolescent evaluations, parents and caregivers are involved in the evaluation process to provide information regarding the client's history and background information. However,

unlike childhood evaluations, adolescent clients often have more ability to participate in the evaluation; therefore, it is important to include them in the diagnosis. Due to the difficulty with insight many adolescents with ASD have, it may be necessary to gain information regarding the client's level of functioning from the parent. The client may consider asking the parent or guardian for additional information disrespectful. It is, therefore, important to explain the benefits of gathering information from multiple sources to the individual, and obtain assent from the client when obtaining information from the parents regarding the client's symptoms (Trammell et al., 2013).

Differentiating Symptoms of ASD from other Comorbid Symptoms. Adolescents with autism have a variety of symptom manifestation that provides challenges for the diagnosis of autism (Schriber et al., 2014). It is difficult to determine what symptoms are caused by autism, and which are caused by a comorbid disorder, even for experienced clinicians (Deprey & Ozonoff, 2009). For example, subtle differences in symptom expression have been found between males and females (Matson, Kozlowski, Hattier, Horovitz, & Sipes, 2012), and studies have found cross-cultural differences in symptom severity (Kreiser & White, 2014) and challenging behaviors (Chung et al., 2012). These symptom manifestations are often in relation to social skills, internalizing behaviors, and externalizing behaviors.

Social Skills. Adolescents with HFASD, who have gone undiagnosed until adolescence, may have sophisticated ways to mask deficits in social skills. One way to hide social difficulties is to avoid social situations. Adolescents with ASD tend to be loners and have fewer friends than typically developing peers; however, if there are no apparent social deficits, the child is more likely to be seen as shy or a loner by parents and teachers (DeMatteo et al., 2012). Furthermore, differences in social skills between males and females lead to fewer females being diagnosed

with ASD (Kreiser & White, 2014). Although females with ASD are more likely to have more deficits in social skills, sub-threshold females with ASD tend to have higher social skills, but do not meet diagnostic criteria, despite having similar levels of autistic-like traits as their male counterparts. (Dworzynski et al., 2012)

Externalizing Behaviors. Externalizing behaviors (i.e., aggression, hyperactivity) are commonly associated with ASD, but also are indicative of other comorbid conditions. According to a study by Lecavalier (2006), responses on parent-scales indicated approximately 35% of individuals with ASD exhibited clinically significant levels of hyperactivity, 11% experienced moderate to severe self-injurious behaviors (e.g.,, biting or hitting self), and 5% engaged in physical fights. Although Lecavalier (2006) did not find differences between males and females, Kaartinen et al. (2014) found gender differences on levels of aggression. Specifically, males with ASD were more aggressive than typically developing males, while females with ASD were less aggressive than typically developing females (Kaartinen et al., 2014). Externalizing behaviors are more likely to prompt parents and teachers to refer individuals for evaluations (Deprey & Ozonoff, 2009) but often individuals who are higher-functioning are misdiagnosed with a behavior disorder, rather than a pervasive developmental disorder.

Internalizing Behaviors. Although externalizing behaviors are more common among children with ASD, internalizing behaviors (e.g., depression, anxiety) also occur among adolescents with ASD (Mahan & Matson, 2011a). Also, symptoms of anxiety and depression are more common in adolescents with ASD compared to typically developing peers (Park et al., 2012). It is, therefore, important to obtain a history of symptoms to determine whether these symptoms are indicative of ASD or a different disorder. Because symptoms of autism and comorbid diagnoses often mask each other, identifying symptoms and determining the cause can

be challenging (Trammell et al., 2013), especially with the lack of measures identifying comorbid symptoms in individuals with autism, which will be discussed later in the chapter (Deprey & Ozonoff, 2009). Because internalizing symptoms are related to other disorders, adolescents whose primary concern is related to anxiety or depression may not be diagnosed with ASD (Kreiser & White, 2014).

Identification of Comorbid Conditions

In addition to assessing adolescents for ASD, it is important to consider comorbid disorders. Individuals with ASD have an increased risk for comorbid disorders. For example, adolescents with ASD are more likely to have anxiety and depression compared to typically developing peers (Leyfer et al., 2006), and sub-syndromal levels of anxiety and depression are even more frequently observed in individuals with ASD (Buhs & Ladd, 2001). When considering comorbid diagnoses, it is important to separate symptoms to ensure observed symptoms are due to ASD, rather than a different disorder. To effectively differentially diagnose, clinicians should understand how individuals with ASD present various comorbid conditions, as symptoms of ASD often change symptoms expression in other disorders. It is also important to consider various challenges in diagnosing comorbid disorders, such as psychometric issues, challenges with self-report measures, and identifying differences in symptom manifestation.

Differential Diagnosis or Comorbidity. When assessing adolescents with ASD, who present with a range of symptoms, it is important to determine whether they have ASD with a comorbid condition, or if they have a non-ASD disorder. Although symptoms of ASD may be masked by comorbid symptoms, it also is possible symptoms may appear to be related to ASD, but are, in fact, related to a different disorder. Poor eye contact may be related to ASD, but it could also be a symptom of depression, stemming from a desire to distance oneself from social

encounters, or even simply a cultural difference (Deprey & Ozonoff, 2009). By obtaining a complete symptom history, a clinician would be able to differentiate between the two by determining whether poor eye contact was present before other symptoms of depression were exhibited, or if poor eye contact is a recent symptom, related to other symptoms of depression.

Another factor to consider when evaluating comorbidity or differential diagnosis is how symptom manifestation is affected when an individual has multiple diagnoses. Comorbid disorders may present differently for an individual with ASD, due to common cognitive deficits found in individuals with ASD (Deprey & Ozonoff, 2009; Leyfer et al., 2006). For example, individuals with ASD and depression often feel less guilt than individuals with no ASD and depression, but individuals with ASD and depression have significantly more food and eating related symptoms (Matson et al., 2005). Therefore, it is important to understand how various comorbid conditions present for adolescents with ASD, compared to a typically developing population.

Specific Comorbid Disorders and ASD. Adolescents with ASD have higher prevalence rates of comorbid anxiety, mood, and behavior disorders than typically developing peers (Gadow, DeVincent, & Pomeroy, 2006; Park et al., 2012; Solomon, Miller, Taylor, Hinshaw, & Carter, 2012). In fact, several studies have estimate rates of comorbidity to be 70.8-72% of children and adolescents with ASD (Gjevik, Eldevik, Fjaeran-Granum, & Sponheim, 2011; Leyfer et al., 2006; Simonoff et al., 2008). Furthermore, individuals with ASD are more likely to have multiple comorbid conditions. Simonoff et al. (2008) reported of the 70.8% of participants with a comorbid disorder; 41% had two comorbid disorders, and 24% had at least 3 comorbid disorders.

The pervasive developmental deficits associated with ASD impact symptom manifestation for comorbid diagnoses. Therefore, each disorder associated with the Personality Assessment Inventory – Adolescent (PAI-A; Morey, 2007) will be discussed. The PAI-A measures eleven different clinical constructs, common in several comorbid disorders. The constructs discussed in this section are all evaluated by the PAI-A, the main measure used in the proposed study.

Somatic complaints. Somatic complaints are often exhibited through concerns about physical functioning and health matters, in general. When determining whether an individual has somatic complaints it is important to determine whether the complaints are due to medical concerns or general concerns about their health, which are not bound to a specific ailment. Typically, individuals who exhibit somatic complaints have significant health problems, with much of their day geared toward coping with physical injuries. These individuals tend to be in adulthood, rather than adolescence. As such, adolescents with ASD are not expected to have elevations on somatic complaints (Morey, 2007). Other individuals who exhibit high elevations on somatic measures include individuals with chronic alcoholism or drug abuse, hypochondriasis, or conversion disorder. Currently, based on a review of the literature, there is not research on individuals with ASD with any somatoform disorders or somatic complaints, to indicate the prevalence.

Anxiety. Anxiety is a common comorbid diagnosis among adolescents with ASD. However, prevalence rates vary drastically, depending on the definition of anxiety used. Studies that address generalized anxiety disorder (GAD) report lower rates than other anxiety related disorders (Gjevik et al., 2011). Some estimates of comorbidity of GAD are as low as 0% (Gjevik et al., 2011), with more studies ranging from 13.4% (Simonoff et al., 2008) to 35% (Strang et al.,

2012). The prevalence rate for anxiety symptoms increases when looking at subsyndromal levels of anxiety. Strang et al. (2012) found 56% of their sample in the borderline range compared to 33% of the sample in the clinically significant range, and White and Roberson-Nay (2009) found elevated scores in 35% of their sample, but only 25% were clinically significant.

Differences in rates of symptoms may be related to the ratio of females to males in the study. Solomon et al. (2012) found females with ASD had higher rates of anxiety than boys with ASD and typically developed girls, while males with ASD had similar levels of anxiety as typically developed males. This finding is consistent with several articles, indicating gender differences in internalizing symptomology, with females expressing more internalizing symptoms than males (Kreiser & White, 2014)

Other environmental factors may impact the presence of generalized anxiety disorder. One study found parental levels of state anxiety correlated with the severity of anxiety in adolescents' with ASD. Furthermore, parental levels of trait anxiety correlated with parent-reported internalizing and externalizing symptoms. The findings indicated anxious parents might impact prevalence rates of anxiety among adolescents with ASD. In addition, anxiety among adolescents with ASD is often focused on environmental stimuli, such as thunderstorms, transitions, or new environments. Lainhart (1999) suggested this could be due to poor understanding of these phenomena. Regardless, individuals with ASD are more likely to experience specific phobias rather than generalized anxiety. Overall, sub-threshold levels of anxiety and anxiety-related symptoms are common among adolescents with ASD, but GAD does not occur as frequently.

Anxiety-related disorders. Anxiety-related disorders refer to a wide range of disorders related to anxiety. Prevalence rates for anxiety-related disorders vary, as did rates for GAD.

Simonoff et al. (2008) estimated prevalence rates for several anxiety-related disorders and found 10.1% of their sample also had panic disorder, 7.9% had agoraphobia, 29.2% had social anxiety disorder, 8.5% had a simple phobia, 8.2% had obsessive-compulsive disorder (OCD), and .05% had separation anxiety. The wide range of comorbid disorders found among adolescents with ASD indicates that, while GAD is not common, anxiety is a prevalent concern among adolescents with ASD. The PAI-A outlines three types of anxiety related disorders: obsessive-compulsive disorder (OCD), phobias (including social anxiety), and traumatic stress.

Obsessive-compulsive disorder. Classic features of OCD (i.e., obsessions and compulsions) are often seen in individuals with ASD, with rates of comorbidity estimated between 8.2 - 10% of adolescents with ASD (Gjevik et al., 2011; Simonoff et al., 2008). OCD and ASD have several overlapping features, making it difficult to differentially diagnose. For example, individuals diagnosed with either ASD or OCD often exhibit a need for sameness, cognitive inflexibility, sensory seeking behaviors, and repetitive use of objects (Deprey & Ozonoff, 2009). Diagnostic criteria for OCD do not directly include these features; however, they are often seen as part of obsessions (i.e., cognitive inflexibility and need for sameness) and compulsions (i.e., sensory seeking behaviors and repetitive use of objects).

Because symptoms of ASD and OCD overlap, careful consideration of the symptoms is required for accurate diagnosis. Deprey and Ozonoff (2009) recommend that a comorbid diagnosis of OCD be considered rare. Although these symptoms are still important to identify and report, comorbid diagnosis should only be considered when OCD symptoms are significantly different from those commonly seen in ASD populations.

When differentiating between ASD and OCD, one of the key differences is the level of anxiety if a ritual is not completed. Adolescents with OCD, who are not able to complete the

ritual, exhibit high levels of anxiety upon being interrupted. For adolescents with ASD, rituals often bring pleasure, rather than ameliorate anxiety (Deprey & Ozonoff, 2009).

Phobias. Phobias cover a wide range of fears common among adolescents with ASD. Studies have show common phobias related to thunderstorms, dark places, (Matson & Love, 1990) loud noises, and dogs (Gjevik et al., 2011). Prevalence rates for phobias range from 8.2% with a simple phobia to the most common form of phobia among individuals with ASD, which is social phobia, also known as social anxiety.

Social anxiety is the intense fear of social situations with the possibility of being embarrassed (Bellini, 2004; Green, Gilchrist, Burton, & Cox, 2000). Prevalence rates of social anxiety among adolescents with ASD ranges significantly, with some estimates as low as 7% when looking at the DSM-IV criteria for social phobia (Gjevik et al., 2011), and others as high as 49% when looking at clinically significant levels of social anxiety (Bellini, 2006). Social anxiety is often experienced by individuals who have some empathy skills, and are aware of their impact on others, but do not have the social skills needed to avoid negative social interactions, leaving the individual painfully aware of their behavior with no ability to change it on their own (Bellini, 2004). Social anxiety often leads to feeling unaccepted and unsupported by peers (Bellini, 2004) and increased negative social interactions (La Greca & Lopez, 1998). These feelings of anxiety and nonacceptance can be particularly detrimental for adolescents with ASD, who have limited opportunities to engage in social interactions, and therefore, to practice skills. Interactions they do have are then more likely to provide negative social experiences, and only add to the level of social anxiety previously experienced (Ginsburg, Greca, & Silverman, 1998).

When diagnosing an adolescent with a comorbid social anxiety disorder or social phobia, it is important to consider whether the symptoms are due to ASD or warrant an additional

diagnosis (Deprey & Ozonoff, 2009). Social deficits associated with ASD naturally lead to anxiety regarding social interactions; however, individuals with ASD who have a comorbid diagnosis of social anxiety are likely to experience increased levels of physiological arousal in addition to anxious thoughts (Bellini, 2006). The difference in physiological arousal is the key difference between adolescents with only ASD and those with comorbid social phobia.

Traumatic stress. Literature involving traumatic stress in adolescents with ASD is limited; however, some studies have looked at traumatic stress in individuals with pervasive developmental disorders, in general. Turk, Robbins, and Woodhead (2005) described two case studies of individuals with intellectual disability (ID) and Fragile X Syndrome, who were exposed to traumatic events. Both participants exhibited symptoms common in individuals with post-traumatic stress disorder (PTSD), such as frequently discussing the accident, then quickly changing topics, becoming anxious in environments reminiscent of the traumatic event, and reenacting or reliving the traumatic event. Of important note was that full diagnostic criteria were not met for these individuals due to deficits in language, which impacted their ability to express emotions and internal states. Otherwise, individuals with ID and Fragile X syndrome who were exposed to a traumatic event demonstrated similar symptoms to typically developing individuals with PTSD.

Depression. Depression is one of the most commonly reported comorbid disorders among adolescents with ASD (Leyfer et al., 2006; Simonoff et al., 2008). In fact, depression is more common among adolescents with ASD than typically developing peers or adolescents with ADHD (Gadow et al., 2012; Solomon et al., 2012). Estimates of depressive episodes range considerably. Studies that use various depression measures to determine clinically significant levels of depressive symptoms report prevalence rates from 10.1% to 30%, with an additional

13.8 to 44% experiencing subsyndromal symptoms of depression (Leyfer et al., 2006; Strang et al., 2012). Furthermore, several studies have looked at diagnostic criteria for various mood disorders reported fewer instances of comorbidity. Gjevik et al. (2011) reported 7% of the adolescents with ASD in his sample had Depressive disorder NOS, 1.5% also had major depressive disorder, and 1.5% had dysthymic disorder. Solomon et al. (2012) found that of the sample of adolescents with ASD, only 1.4% had a depressive disorder, with .09% meeting criteria for major depressive disorder and 0.5% meeting criteria for dysthymic disorder.

Adolescents with ASD may present symptoms of depression differently due to deficits in introspection and communication. Individuals experiencing symptoms of depression often report feelings of loneliness, irritable mood, feelings of worthlessness, and unwarranted guilt (Deprey & Ozonoff, 2009). These symptoms may be difficult for adolescents with ASD to identify and express to others. Therefore, feelings associated with depression are less frequently reported during evaluations. Other symptoms, such as changes in weight, sleep patterns, or loss of interest are more easily observable and do not require more complex communication skills to express.

Mania. Type 1 and Type 2 bipolar disorder are not common among adolescents with ASD. Prevalence estimate studies often report few participants with mania or bipolar disorder, ranging from 0-2.8% of the sample (Gjevik et al., 2011; Leyfer et al., 2006; Stahlberg, Soderstrom, Rastam, & Gillberg, 2004). However, symptoms of ASD may be confused for symptoms of bipolar disorder. For example, adolescents with ASD often have difficulties regulating their speech in regards to prosody. Difficulties with prosody could easily be confused for pressured speech seen during a manic episode. Moreover, engaging in risky activities, one of the hallmarks of manic episodes, may be seen in individuals with ASD. When differentially diagnosing mania and ASD, it is important to determine the cause of engaging in risky behavior.

Adolescents with ASD may not have considered the behavior to be dangerous, whereas adolescents experiencing a manic episode may engage in the behaviors, despite known risks. In addition, emotional regulation is a symptom for both ASD and bipolar. The difference is whether the deficits in emotional regulation occur all the time or only during manic episodes. By gathering baseline data, clinicians can differentiate the cause of the deficits in emotional regulation. Other overlapping symptoms include irritability, and lack of fear, high levels of activity and talkativeness (Deprey & Ozonoff, 2009).

Schizophrenia. Schizophrenia also is rare among individuals with ASD, although several symptoms related to Schizophrenia are commonly seen in adolescents with ASD. As with mania, prevalence estimates range from 0-6% (Gjevik et al., 2011; Leyfer et al., 2006; Stahlberg et al., 2004). Symptoms commonly seen in individuals with schizophrenia include both positive symptoms, such as delusions, hallucinations, and disorganized speech, as well as negative symptoms like alogia, flat affect, and avolition (APA, 2013). In general, symptoms of schizophrenia and ASD are not similar. However, some symptoms of ASD can be mistakenly identified as symptoms of schizophrenia. For example, individuals with ASD exhibit communication difficulties, which could look like disorganized speech, which is often observed in individuals with ASD. In addition, unusual sensory interests could be interpreted as the individual experiencing hallucinations, and lack of motivation could be mistaken for negative symptoms of schizophrenia (Lainhart, 1999). Therefore, it is important to thoroughly examine symptoms before making a differential diagnosis between schizophrenia and ASD.

Paranoia. Adolescents with ASD often experience a kind of social paranoia that may stem from deficits in social awareness (Pinkham et al., 2012). Studies have shown individuals with ASD experience more paranoia than typically developed peers (Maras & Bowler, 2012)

Paranoia is commonly seen in both individuals with schizophrenia and ASD. Symptoms of paranoia are related to the belief that another person, organization, or group is trying to harm someone. Pinkham et al. (2012) compared features of paranoia and schizophrenia to look for diagnostic differences. Three factors were examined: paranoia, cynicism, and insightful acknowledgement. The two groups of interest were the schizophrenia with paranoia group and the ASD group. Both groups experienced similar levels of paranoia; however, the ASD group experienced higher levels of cynicism. Upon qualitative analysis of the answers, it appeared individuals with ASD experienced a kind of "social cynicism, " where answers reflected suspicions from other people and in various social situations. The third trait, insightful acknowledgement, separated individuals with schizophrenia from individuals with ASD, as the schizophrenia group had higher levels of insight into difficulties of living with a psychological disorder.

Borderline Features. Despite significant differences in presentation between Borderline personality disorder (BPD) and ASD, there are a number of similarities between the two disorders (Rydén, Rydén, & Hetta, 2008). Individuals with BPD exhibit difficulties maintaining relationships, emotional regulation, and verbalizing strong emotions or stressful experiences, often taking action instead of communicating intense feelings. Although some studies have focused on cluster A personality disorders (i.e., paranoid, schizoid, schizotypal), few studies have focused on cluster B personality disorders (i.e., antisocial, borderline, histrionic, narcissistic). Rydén et al. (2008) assessed 41 adult females diagnosed with BPD to determine if there also were symptoms of autism. In their sample, 14.6% of participants with BPD met diagnostic criteria for ASD. Individuals diagnosed with both BPD and ASD differed significantly from those diagnosed only with BPD. Self-hate was higher for the BPD and ASD

group, and self-love and self-affirmation were significantly lower. The study also reported a small but insignificant increase in overall suicide attempts for individuals with BPD and ASD. However, more research is needed to examine the relationship. The study also provides support for differences in female and male comorbid symptoms, as individuals with BPD are predominantly female (APA, 2013). Females with ASD may be more likely to exhibit more borderline features, however, more research is needed.

Antisocial Features. Few studies have examined the relationship between ASD and antisocial personality disorder (APD). APD is characterized by a blatant disregard for and violation of the rights of others (APA, 2013). One study looking at rates of personality disorders among adolescents with ASD found no one in their sample had a comorbid diagnosis of APD (Lugnegård, Hallerbäck, & Gillberg, 2012). Although both disorders have a lack of empathy for others, antisocial behaviors necessitate a good understanding of other's thoughts and feelings in order to manipulate and deceive others. Individuals with ASD do lack empathy, but this is due to a core deficit in understanding others, rather than using it to manipulate others on purpose.

Drug and Alcohol Problems. Limited research has been conducted on alcohol abuse and individuals with ASD. Some individuals may engage in alcohol abuse to relieve social anxiety, however, it is more difficult to document drug use in individuals with ASD because of it's illegal nature (Tinsley & Hendrickx, 2008). One study looked at drug use in adolescents with Asperger syndrome and found that they were less likely to use drugs compared to sample adolescent population in part due to a more limited friend group, less accesses to drugs, and more protective factors (i.e.g, quality of family relationship, academic variables, avoidance of dangerous situations) (Ramos et al., 2013). Individuals with ASD have been shown to exhibit fewer problems with alcohol and drug abuse compared to typical populations (Ozonoff et al., 2005),

indicating it may not be as much of a concern for adolescents with ASD. One reason there may be a lower risk of alcohol and drug abuse in individuals with ASD is because many adults who are undiagnosed, but have HFASD may be engaging in drug and alcohol abuse to self-medicate social anxiety associated with ASD (Tinsley & Hendrickx, 2008).

Comorbid Diagnosis Measures for Adolescents with ASD

Although it is common for individuals with ASD to have comorbid conditions, there are few measures designed specifically to assist clinicians when assessing individuals with ASD. Specifically, few standardized measures exist to diagnose individuals with ASD with comorbid disorders (Leyfer et al., 2006). Measures commonly used by clinicians often have no ASD standardization sample; therefore, comparisons between ASD populations and the individual are difficult to make. Another method of obtaining information regarding comorbid symptoms is the use of structured and semi-structured interviews, which have been adapted for use with individuals with ASD (Deprey & Ozonoff, 2009).

Measures of Comorbid Diagnosis. The literature provides a wide range of measures, checklists, and scales to assess various symptoms of psychological disorders. However, few have been created for use with ASD. Therefore, researchers have studied several measures and found them to be useful when looking at various behaviors seen in individuals with ASD. The following scales are only a few of the numerous scales used to evaluate a wide range of clinical symptoms. These scales have been shown to be useful when evaluating individuals with ASD.

Aberrant Behavior Checklist – Community (ABC-Community). The ABC-Community (Aman, Singh, Stewart, & Field, 1985) is a 58-item behavior checklist that evaluates problem behaviors in the past four weeks. Parents, teachers, or clinicians can complete this scale to evaluate individuals as young as age 6. There are five subscales: Irritability, Socially Withdrawn

Behavior and Lethargy, Stereotyped Behavior, Hyperactivity and Noncompliance, and Inappropriate Speech Patterns.

The ABC-Community was designed for individuals with pervasive developmental disabilities who exhibit a wide range of behaviors, but was not originally designed for use with individuals with ASD. The ABC-Community was originally developed for individuals with Prader-Willi syndrome, Fragile X, Cri-du-chat, and other neurogenic disorders. Since then, a few studies have been published on its use with ASD. Brinkley et al. (2007) examined the factorial structure of the ABC-Community in a sample of children and adolescents with ASD, finding the ABC-Community was an effective measure, and even created a self-injurious behavior factor from several items in the scale. Ji, Capone, and Kaufmann (2011) distinguished between behaviors found in individuals with Down syndrome only and individuals with Down syndrome with comorbid ASD. Furthermore, they separated the DS and ASD group into two smaller clusters based on the types of ASD behaviors exhibited.

The Achenbach System of Empirically Based Assessment (ASEBA). The ASEBA (Achenbach & Rescorla, 2001) is a broad assessment. It measures symptoms of depression, anxiety, somatic complaints, obsessive-compulsive behaviors, attention problems, social difficulties, aggressive behavior, and atypical thinking across the lifespan (Deprey & Ozonoff, 2009). There is a wide range of forms for each age of development (i.e., preschool, childhood, adults, older adults) and several different versions for parent, teacher, and self. Although the adult versions were not specifically designed for use with individuals with ASD, the children's version includes diagnostic information specifically for assessing ASD. The Child Behavior Checklist (CBCL), the caregiver form of the child ASEBA, has been used to differentiate ASD form other psychiatric conditions (Duarte, Bordin, De Oliveira, & Bird, 2003), as well as

identifying comorbid disorders, specifically ADHD and manic episodes, in individuals with ASD (Holtmann, Bölte, & Poustka, 2007).

Behavior Assessment Systems for Children, Second Edition (BASC-2). The BASC-2 (Reynolds & Kamphaus, 2004) is a measure used for children with ASD. The BASC-2 measures symptoms related to major depressive disorder, generalized anxiety disorder, ADHD, behavior disorders, psychosis, and tic disorders (Deprey & Ozonoff, 2009). Like the ASEBA, there are three different forms: parent, teacher, and self. Several studies have studied the BASC-2 in regards to ASD. There have been many studies looking at how parents, teachers, and individuals with ASD respond on the BASC-2 (Goldin, Matson, Konst, & Adams, 2014; Mahan & Matson, 2011a, 2011b; Volker et al., 2010). Overall, research has supported the use of the BASC-2 with individuals with ASD when evaluating symptoms related to ASD, as well as comorbid conditions, such as depression and anxiety.

Nisonger Child Behavior Rating Form (NCBRF). The NCBRF (Aman, Tassé, Rojahn, & Hammer, 1996) was specifically developed for individuals with developmental disabilities and further research conducted the factorial structure of the NCBRF for individuals with ASD (Lecavalier, Aman, Hammer, Stoica, & Mathews, 2004). It includes a teacher and parent rating form to evaluate symptoms of depression, mania, anxiety, behavioral non-compliance, self-injury, ADHD and tic disorders (Deprey & Ozonoff, 2009). There are six subscales: Conduct Problems, Insecure/Anxious, Hyperactive, Self-Isolated/Ritualistic, Self-Injury/Stereotypic and Overly Sensitive for the parent version and irritable on the teacher version. Furthermore, the NCBRF has been used to assess other behavioral symptoms associated with ASD (Lecavalier, 2006)

Structured and Semi-Structured Interview Schedules for Comorbid Diagnosis.

Autism Comorbidity Interview – Present and Lifetime Version (ACI-PL). Autism Comorbidity Interview – Present and Lifetime Version (ACI-PL; Lainhart, Leyfer, & Folstein, 2003) is a semi-structured interview that was originally modified from the K-SADS, specifically for individuals with ASD to help with differential diagnosis. Several changes were made to the original measure, including the addition of an introductory section to provide some baseline information about the child's temperament, emotions, and behaviors, as well as descriptions of how each psychiatric disorder typically manifests in individuals with ASD. When asking about the various psychiatric conditions, different screening questions that are more consistent with common symptoms exhibited by individuals with ASD are provided, and the clinician is asked to consider the applicability of each symptom for children with ASD. For example, many individuals with depression lose interest in previously enjoyable activities, but individuals with ASD tend to present with increased agitation, self-injury, and temper-tantrums. Also, feelings of worthlessness may not be applicable if the individual has no ability to communicate such feelings to the clinician. Other modifications made to the K-SADS include adjusting the diagnostic criteria for significant impairment to ensure the comorbid diagnosis added a level of impairment in addition to impairment from ASD symptoms, and the inclusion of subsyndromal diagnostic criteria for individuals with barriers to assessment, such as communication difficulties

Mazefsky and White (2013) tested the reliability and validity of the ACI-PL. One-hundred and nine children with ASD, between the ages of 5 and 17 (mean age = 9.2 years), were assessed with the ACI-PL. After the administration of the ACI-PL, with no information given to the interviewers about previous diagnoses or treatments, the authors found that 44% of the sample met diagnostic criteria for a specific phobia (32% of which were fear of needles and fear

of crowds), 37% of the sample met criteria for obsessive compulsive disorder (OCD), 31% of the sample met criteria for ADHD (with 55% of the sample exhibiting subsyndromal behavior), 10% of the sample met criteria for major depression, and less than 2% meeting criteria for having a manic episode and bipolar I disorder. No children met criteria for schizophrenia or panic disorder.

Kiddie-Schedule for Affective Disorders & Schizophrenia (K-SADS). One measure used for assessing comorbidity among individuals with ASD is the Kiddie-Schedule for Affective Disorders & Schizophrenia (K-SADS; Kaufman, Birmaher, Brent, Rau, & Ryan, 1996). The K-SADS is a semi-structured interview with branching for children ages 6 to 18 that assesses lifetime and current symptoms for a variety of psychiatric disorders, based on DSM-III and DSM-IV criteria. Although the interview is not designed for individuals with ASD and does not look for any symptoms of ASD, the K-SADS has been used as a way for clinicians to assess for other comorbid diagnoses.

Anxiety Disorders Interview Schedule-IV (ADIS-IV). Another measure is the Anxiety Disorders Interview Schedule-IV (ADIS-IV; Silverman & Albano, 1996), which is a semi-structured interview that provides an in-depth assessment of anxiety disorders. Because anxiety-related disorders are common among adolescents with ASD, this assessment is better equipped to differentiate between various types of anxiety, from more common forms such as generalized anxiety disorder, to other disorders associated with anxiety, such as selective mutism, eating disorders, and school refusal behavior. The ADIS-IV includes ten different interview schedules, five for parents and five for the child. The schedules were not designed for use with children and adolescents with ASD, however. Therefore, it may be difficult to obtain accurate information as questions were not designed to elicit information from children and adolescents with ASD.

Child and Adolescent Psychiatric Assessment (CAPA). The Child and Adolescent Psychiatric Assessment (CAPA; Angold & Costello, 1995) is a semi-structured interview for individuals between the ages of 8 and 18, which provides a detailed description of environmental factors, such as the relationship between the child and their parents, as well as symptomology for various comorbid disorders. The interview schedules are very specific, providing a great amount of detail to the clinician. Again, the interview was designed for typically developing individuals, rather than individuals with ASD.

The Diagnostic Interview Schedule for Children (DISC). The Diagnostic Interview Schedule for Children (DISC; Shaffer, Fisher, Lucas, Dulcan, & Schwab-Stone, 2000) is a highly structured interview with branching that provides a detailed history of various symptomology for children between the ages of 9 and 17. It is easily administered by clinicians and also available in Spanish. Again, this interview does not include symptoms of any developmental disabilities or speech and language impairments, but includes a highly detailed background on various mood disorders, such as generalized anxiety, panic, major depressive episodes, and ADHD. Like other measures, the DISC was not designed for individuals with ASD and should be used with caution.

Challenges for Comorbid Evaluations.

Evaluations for comorbidity among adolescents with ASD provide several challenges for clinicians. First, measures and interview schedules are often not normed for adolescents with ASD. Furthermore, many of these measures solicit information from the client with self-report measures, which may be difficult for clients to answer due to deficits in communication. Finally, differences in symptom manifestation in adolescents with ASD are different than typically developing peers.

Psychometric Issues. Measures of comorbidity commonly used for evaluating adolescents with ASD often do not have ASD individuals in the standardization sample, neither are there reliability and validity studies that include individuals with ASD. Therefore, it can be difficult to interpret responses on these measures (Deprey & Ozonoff, 2009). Adolescents with ASD often have difficulty interpreting statements about feelings and thoughts of others correctly. Answers to questions regarding feelings and thoughts could be accurate, or they could reflect a misinterpretation of the question. It is, therefore, important to independently corroborate scores on measures not normed on individuals with ASD. Furthermore, differentiating symptoms related to autism versus another disorder may be difficult without a comparison group, (i.e., standardization sample). An adolescent with ASD may score high on any given scale due to ASD symptoms, as well as symptoms of other disorders. Therefore, clinicians are not able to determine whether elevations are clinically significant for other comorbid disorders or simply due to symptoms of ASD (Deprey & Ozonoff, 2009).

Self-Report Measures. Most measures used for assessing ASD are filled out by teachers, parents or guardians who have been utilized to diagnose children with autism, but self-rating measures have not been traditionally used because research suggests individuals with ASD have less self-awareness than typically developing peers. Individuals with ASD are thought of as being unable to engage in self-reflection, which has been largely prohibitive in the use of self-rating measures and led many clinicians to have parents provide ratings for their children. Kreiser and White (2014) compared the accuracy of self-report measures for individuals with ASD and typically developed peers. Moreover, the study verified self-ratings with parent-ratings. Their findings suggest differences between parent and self-ratings in the ASD group were comparable to differences in the typically developing group, indicating that they have a similar

level of insight as typically developing peers when rating their own behaviors. This consistency lends support to the current study, as it demonstrates the accuracy of self-report measures for individuals with ASD.

Differences in symptom manifestation. Adolescents with ASD often are unable to communicate internal states relating to emotions and feelings, which is necessary for diagnosis of several common comorbid psychological disorders, including and GAD, depression, PTSD (Strang et al., 2012). Therefore, careful consideration is required before dismissing other symptoms of comorbid disorders. In particular, individuals with ASD are more likely to exhibit behavioral symptoms associated with comorbid disorders, rather than internalizing symptoms. These differences in symptom manifestation are often not taken into account by measures and structure interviews, and therefore, the clinician must account for these differences when providing differential diagnoses (Deprey & Ozonoff, 2009).

Personality Assessments

Personality assessments were originally created to assess personality constructs, but more recent personality assessments have been developed to assess adjustment. Specifically, looking at the levels of various clinical constructs commonly seen among individuals with psychological disorders. This trend originally started with the Minnesota Multiphasic Personality Inventory, second edition (MMPI; Hathaway & McKinley, 1943), which is now the most widely-used adjustment-oriented personality scale (Butcher, 2010). After the success of the MMPI, the Millon Clinical Multiaxial Inventory (MCMI; Millon, 1983) and the Personality Assessment Inventory (PAI; Morey & Boggs, 1991) were developed. These measures increasingly focused on assessing personality problems as related to psychopathology, such as anxiety, depression,

mania, drug dependence, and somatoform disorder, but have not been used to evaluate symptoms of ASD or comorbidity in individuals with ASD.

Personality Assessment and Autism

Personality assessments have not commonly been used to evaluate individuals with ASD; however, recent research has begun to look at personality profiles and various clinical constructs in individuals with ASD. Individuals with ASD have similar traits that have been found in typically developing individuals as well. The Broad Autism Phenotype (BAP) lends credence to the idea individuals with ASD have specific characteristics and traits that are consistent with those observed in typically developed individuals, especially relatives of individuals with ASD (Ingersoll, 2010).

Research on personality traits in individuals with ASD has been conducted on several aspects of personality development throughout the lifespan. Butcher (2010) looked at temperament in infants who were later diagnosed with autism and found that even at a young age, the diagnosis of autism was associated with a greater tendency to be fearful, easily frustrated and irritable, and lesser tendency to sustain attention, regulate emotions, and engage in an emotionally positive way with others. Later personality development is also affected by ASD, as various studies have found some or all of the personality traits, related to the five-factor model of personality (i.e., neuroticism, extroversion, openness, agreeableness, and conscientiousness), were significantly different than typically developing individuals (De Pauw et al., 2011; Fortenberry et al., 2011). De Pauw et al. (2011) found that introversion, conscientiousness, and openness factors were significant lower in individuals with ASD and neuroticism and agreeableness were not found to be significantly different than typically developing individuals, while Fortenberry et al. (2011) found individuals with ASD were significantly more neurotic,

less extraverted, agreeable, conscientious, and open to experiences than typically developing individuals. Although a definite personality profile has not yet been identified, successfully identifying common personality traits among individuals with ASD may lead to improving accurate diagnoses.

Assessment measures that focus on adjustment and clinical constructs have not been widely researched. Currently, there is no research related to personality assessment of adolescents with ASD. There has been one study with adults with ASD and the MMPI-2.

Ozonoff et al. (2005) assessed the personality and psychopathology profile a group of adults with ASD, using the MMPI-2. Intelligence and symptom severity were controlled for, as well as diagnosed comorbid disorders. Although the sample size was too small for statistical analyses, the effect size for each scale was calculated. The results of the analyses found several important findings, related to developing a profile for adults with ASD. First, there were large group differences for several validity scales (i.e., Fb, Fp, and L), and a medium size effect on the F-scale. It is important to note that while these were higher, they did not invalidate the measure. Furthermore, the high scores on the L scale indicate not only lying, but also an individual being ridged, moralistic, and having limited insight, which are typical of individuals with ASD and aid in compiling a comprehensive profile of their symptomology. Furthermore, there were large group differences on the social isolation and depression scales, and medium sized difference on the schizophrenia scale, specifically the social alienation and general maladjustment subscales. There also were elevations on various scales related to anxiety symptoms, including the post-traumatic stress disorder scale, obsessive-compulsive disorder scale, anxiety scale, and social discomfort scale. Finally, in relation to personality traits, individuals with ASD were higher on aggressiveness and disconstraint and lower on introversion, again consistent with symptoms of

autism. The authors concluded there is a specific personality profile related to symptoms of ASD, and that this measure could be used to identify comorbidity as well.

Because ASD appears to have a personality profile (Ozonoff et al., 2005), it is reasonable to assume that this can be measured with personality assessment tools. Few studies have assessed individuals with ASD using personality assessments, as it is commonly believed individuals with ASD have limited self-perception skills; however, studies have shown individuals with ASD are capable of accurately reporting about their behavior compared to typically developing peers (Schriber et al., 2014).

Personality Assessment Inventory – Adolescent and ASD

The PAI-A has been used to measure clinical constructs in individuals with mood, thought and behavior disorders, but have not been used to assess individuals with pervasive developmental disorders, such as ASD (Morey, 2007). In fact, only one study has been conducted with adults with ASD and a personality measure, and there is no research with adolescents with ASD and measures of psychological adjustment. Furthermore, there is no standardization sample or validity and reliability testing for the PAI-A on adolescents with ASD. Despite the lack of research on the PAI-A, other studies have shown that the PAI-A has the potential to be a useful evaluative measure of comorbid symptoms in adolescents with ASD (Ozonoff et al., 2005). The proposed study will take an initial step by conducting a profile analysis with individuals with ASD to determine how adolescents with ASD compare to a community sample and clinical sample.

Chapter Summary

Autism is a pervasive developmental disorder that affects 1 in 68 individuals in the United States. It is primarily characterized by deficits in social skills and communication and

restricted and repetitive behaviors and interests. Adolescence is often a difficult developmental stage due to a lack of sex education, increased social complexity, and difficulty initiating and maintaining friendships.

Initial evaluations and re-evaluations are commonly conducted when adolescents with ASD begin to display increased difficulties with social interactions, puberty, emotional regulation, or transition issues. Clinicians are often presented with a difficult evaluation due to vague referral concerns and a lack assessment measures designed specifically for individuals with ASD. In addition, obtaining accurate information is difficult as the clients are older and much of their early developmental history may have been forgotten over time. Moreover, deficits in communication, social awareness, and expressing internal states are common among adolescents with ASD, making necessary diagnostic information difficult to obtain. Finally, comorbid symptoms may mask symptoms of ASD. Clinicians need to determine the root causes of symptoms to determine if they are associated with common deficits in individuals with ASD, or other diagnoses.

Differential diagnosis and comorbid diagnoses are especially important for adolescents with ASD to ensure symptoms are adequately addressed. Several comorbid conditions are common among adolescents with ASD, especially anxiety, depression. Adolescents with ASD have high rates of comorbidity with a number of psychological disorders, which can be assessed with a variety of measures and structured interviews designed to aid in comorbid diagnosis. Unfortunately, most measures have not been standardized including individuals with ASD, making interpretation difficult. Moreover, it is difficult to get accurate information from self-report measures, which may be necessary to identify internalizing symptoms for adolescents with ASD. Furthermore, differences in symptom manifestation for comorbid disorders makes it

difficult to determine whether a diagnosis is appropriate. Personality measures have been used to look at comorbidity and psychological adjustment in many populations, but there is currently no research on their use with individuals with ASD. Therefore, the proposed study examines the profile analysis for the PAI-A for adolescents with ASD.

CHAPTER III

Research Methodology

The current study analyzed the responses on the Personality Assessment Inventory - Adolescent from adolescents with ASD. This chapter describes the methods used to collect these data, including the participants, procedures, and instrumentation used in the study.

Participants

The adolescents who participated in this study were a sample of convenience, obtained from participants throughout the United States and Canada. Due to limited interest in completing the study among adolescents with ASD, leniency was allowed for individuals with a PDD-NOS diagnosis or an educational label of Autism Spectrum Disorder, although individuals only able to provide an educational label were only accepted if they attended specialized schools for students with Autism Spectrum Disorder. Research flyers were sent to research websites, local and national autism organizations, school districts, and mental health clinics across the United States. For every 4-5 people who responded to the flyer, approximately 1 person completed the study and returned the materials. Participants who did not complete the study reported a variety of concerns, including low motivation to complete a lengthy questionnaire, difficulty finding documentation of diagnosis, and parental concerns regarding the content of questions on the PAI-A. Twenty adolescents (Male = 13, Female = 7), ranging from age 12 to 18 (Mean = 14.9, SD= 2.06) participated after permission was obtained by the individual if they were age 18, or by

parent if younger than age 18 (see Appendices A, B, C, and D to review demographics form and permission forms). The participants identified their ethnicity as follows: Caucasian (16), Hispanic (1), Multi-racial (1), Native American (1), and Other (1)

The ASD sample is significantly different from the overall population of individuals with ASD in regards to race and gender. Ozonoff et al. (2005) noted the prevalence rate for Caucasians to African American individuals was 1.2:1 and the ratio of Caucasians to Hispanics is 1.5:1. The current sample is over-representative of Caucasian participants compared to Hispanic participants (20:1) and African American participants, which are not represented at all in the current study. In addition, Orzonoff et al. (2005) found the ratio of males to females with ASD was overall 4.6:1. The current study has an over-representation of females with ASD (1.8:1).

Participants in the study provided documentation of a diagnosis by a licensed psychologist, school psychologist, or physician. Within the sample, 13 participants had a diagnosis of Autism Spectrum Disorder, 1 with a diagnosis of PDD-NOS, 2 had Autistic Disorder, and 2 had an educational label of Autism Spectrum Disorder. Two more participants were unable to provide verification of their diagnosis. In addition, comorbidity information was included. Participants reported additional diagnoses of social anxiety (n=1), generalized anxiety disorder (n=1), Language impairment (n=2, and learning disability (n=1). All participants had at least a 4th grade reading level, as verified by a teacher individualized education plan, which was required to independently read the PAI-A (Schinka & Borum, 1993).

The community and clinical sample collected for this study was matched to the ASD sample collected, based on gender, ethnicity, and age. Twenty matched participants were randomly chosen for a community sample and a clinical sample, by the author of the PAI-A,

Leslie C. Morey, after being provided with a frequency of the age, sex, and ethnicity of the ASD sample.

Community Standardization Sample. The community standardization sample for the PAI-A includes 707 participants between the ages of 12 and 18. These participants were drawn from a total sample of 1,032 individuals and then matched to the 2003 U.S. Census data. Based on the census data, 51.1% of the sample was male, 61.5% was Caucasian, 15.4% was African-American, 16.3% was Hispanic, and 6.8% were other ethnicities. The only inclusionary criterion for this sample was 90% completion of the PAI-A items. The participants were from 21 states at various junior high schools, high schools, and colleges. Sites were chosen through random zip code selection; however, the sites were not randomly selected in order to yield sample characteristics similar to the 2003 U.S. Census population report.

The sample analyzed in the present study was comprised of 20 participants from the original community standardization sample, who were matched in regards to age, sex, and ethnicity, to the ASD sample. None of the participants in the community sample had a mental or physical disorder. The sample included 14 males and 6 females, with a mean age of 14.6 (SD = 1.81). The reported ethnicity included Caucasian participants (n=15), African American (n=2), and a Hispanic participant (n=3).

Clinical Standardization Sample. The clinical standardization sample for the PAI-A includes 1,160 participants with an average age of 15.29 years and a range from 12 to 18 years. The participants in the sample had a variety of diagnoses, including conduct disorder (23.6%), drug/alcohol abuse or dependence (19.3%), attention deficit/hyperactivity disorder (18.1%), major depressive episode (15.9%), oppositional defiant disorder (13.4%), adjustment disorder (7.7%), mood disorder not otherwise specified (6.0%), dysthymic disorder (5.3%), posttraumatic

stress disorder (3.9%), mania or hypomania (3.5%), learning disability (2.0%), abuse of child (1.9%), borderline personality disorder (1.6%), and organic mental disorder (1.5%). The clinical sample is composed of 58.4% males, 72.3% Caucasian, 19.8% African American, 4.5% Hispanic, and 4.4% other ethnicities. The settings the participants came from included outpatient mental health clinics (49.7%), inpatient mental health clinics (12.7%), juvenile and correctional facilities (33.3%), outpatient medical facilities (0.2%), inpatient medical facilities (0.1%), school counseling (0.8%), and other settings (3.3%).

The sample analyzed in the present study was comprised of 20 participants from the original clinical standardization sample, who were matched in regards to age, sex, and ethnicity, to the ASD sample. All of the participants had at least one medical or psychological disorder, but none of the participants had a pervasive developmental disorder. The participants presented with the following diagnoses: a medical diagnosis (n=1), alcoholism (n=1), drug abuse (n=1), major depression (n=3), antisocial personality disorder (n=1), post-traumatic stress disorder (n=2), adjustment reactions (n=1), anxiety disorder (n=1), somatoform disorder (n=1), conduct disorder (n=6), attention-deficit/hyperactivity disorder (n=6), oppositional defiant disorder (n=3), learning disability (n=1), Mood NOS (n=1), and abuse history (n=1). The sample included 14 males and 6 females, with a mean age of 15.1 (SD = 1.83). The reported ethnicity included Caucasian participants (n=15), African American (n=3), a Hispanic participant (n=1) and a participant who declined to report their ethnicity (n=1).

Measures

The Personality Assessment Inventory – Adolescent (PAI-A). The PAI-A is a reliable and valid measure of objective personality in adolescents. The PAI-A has been normed on adolescents between the ages of 12 to 18 and can be used to assess adolescents with at least a 4th

grade reading level (Schinka & Borum, 1993). The PAI-A norming sample matched the census for all demographic variables (i.e., provide examples of variables), making this a reliable measure for diverse populations as well.

Based on the Personality Assessment Inventory (PAI), the adolescent version of this test adapted several elements of the PAI to make them relevant for adolescents. First, test questions were altered to be more applicable to adolescents. The aim of this was not to optimize the utility of these questions for adolescent use, rather to maintain the original interpretation of the item for adolescents. For example, references to school were added while references to employment were minimalized. Additionally, the PAI-A also assessed the same clinical syndromes as the PAI, as they were found to be stable diagnostic patterns, and important for diagnostic and treatment considerations.

The standardization for the PAI-A includes a community sample as well as a clinical sample. The community sample has 707 census-matched participants across gender, ethnicity, and age, from various locations in 21 different states. The only exclusion criterion was less than 90% completion of the PAI-A. This sample was selected from a larger sample of 1,032 participants, on the basis of age, gender, and race/ethnicity, in accordance with the 2003 U.S. census. Furthermore, based on the demographic variables, items were selected from the initial item pool to ensure utility across demographic groups. The clinical group consisted of 1160 clinical individuals from 78 various clinical sites. Clinical diagnoses include, but are not limited to, conduct disorder, depression, anxiety, and attention deficit/hyperactivity disorder (ADHD).

There are four validity scales included in the PAI-A. Two scales, Inconsistency scale and Infrequency, account for nonsystematic sources of distortion, while the other two scales, Negative Impression and Positive Impression, account for systematic sources of profile

distortion. The Inconsistency scale (ICN) assesses the consistency of responding for similar items, which identifies random response patterns. The Infrequency scale (INF) identifies atypical response profiles, due to carelessness, confusion, reading comprehension difficulties, idiosyncratic item interpretation, or other sources of random responding. Additionally, the Negative Impression scale (NIM) identifies scores that have a negative distortion, indicating the presence of malingering or feigning, while the Positive Impression scale (PIM) indicates positive distortions, indicating defensiveness, denial, or lacking insight into personal shortcomings.

Additionally, the PAI-A has 11 clinical scales, each with three or four subscales, and six treatment consideration scales. The main clinical scales consist of Somatic Complaints, Anxiety, Anxiety-Related Disorders, Depression, Mania, Paranoia, Schizophrenia, Borderline Features, Antisocial Features, Alcohol Problems, and Drug Problems. The treatment consideration scales include aggression, suicidal, stress, nonsupport, treatment rejection, and interpersonal skills, which include dominance and warmth. These scales are described in more detail in Table 3.1**.**

All scales in the PAI-A are scaled using T scores, which have a mean score of 50, with a standard deviation of 10. A score of greater than 50T would indicate the respondent endorsed items reflective of that particular construct, and a score of less than 50T would indicate the respondent did not endorse items reflective of that particular construct. Although all scales on the PAI-A scores were scaled with T scores, it is important to consider each scale individually when interpreting elevations. General interpretation guidelines suggest a score of 60T (i.e., one standard deviation above the mean) indicates an area of concern that is higher than in the general population, but not of clinical concern, and a score of 70T (i.e., two standard deviations above the mean) indicates a clinically significant concern. Although the standard deviation is a good indicator of elevation, adolescents tend to report experiences atypical for the general population.

Therefore, it is important to consider whether the experience is atypical for the clinical population norms as well. By comparing the ASD profiles to the clinical profiles, it will help determine the intensity of the reported symptoms and determine whether they are of clinical significance.

Reliability. Morey (2007) reported internal consistency reliability and test-retest reliability data. The internal consistency, which is the correlation between items within a scale, for the PAI-A, indicated a high level of consistency in the clinical scales and subscales, with an average coefficient range from 0.69 to 0.80. Furthermore, the internal consistency for the PAI-A Scales across age, gender, and race were calculated, and high levels of internal consistency were found for all groups, with an average coefficient range from 0.76 to 0.80.

The test-re-test reliability was determined by administering the PAI-A at two different points in time. Some difficulties associated with this were that the scales were designed to be sensitive to treatment, symptom changes, and the course of the disorder, meaning there should be some level of change over time, especially in the clinical sample that is undergoing treatment. A group of 100 adolescents were administered the PAI-A a second time, between 9 and 35 days after the initial test (M= 18.11 days; SD = 5.77). The two tests were highly correlated, with the exception of the ICN and INF scales, which measure random error and, therefore, would not be highly correlated. Based on the test-retest reliability data, the examiner can be 95% certain that an individual's true score is within 1.96 SE_m of the observed score.

Validity. Morey (2007) provided data on construct validity, specifically reporting on the convergent and discriminant validity for the 11 clinical scales. To assess this, several other measures were given in addition to the PAI-A: the MMPI-A (MMPI-A; Butcher et al., 1992), the Adolescent Psychopathology Scales (APS; Reynolds, 1998), the Personality Inventory for Youth

(PIY; Lachar & Gruber, 1995), the NEO Five-Factor Inventory (NEO-FFI; Costa & McCrae, 1989), the Symptom Assessment-45 (SA-45; Avison et al, 1997), the College Adjustment Scales (CAS; Anton &Reed, 1990), the Clinical Assessment of Depression (CAD; Bracken & Howell, 2004), the Adolescent Anger Rating Scale (AARS; Burney, 2001), the Conners' Adult ADHD Rating Scale (CAARS; Conners, Erhardt, & Sparrow, 1999), the Beck Depression Inventory (BDI; Beck & Steer, 1987), and the State Trait Anxiety Inventory (STAI; Spielberger, 1983). The PAI-A's clinical scales were then compared to the scales within these inventories to provide substantial support for each constructs' validity.

To demonstrate the validation of each clinical construct, the researchers gathered data on convergent and discriminant validity. Convergent validity is when two measures, of similar theoretically related constructs, are highly correlated, and discriminant validity is when two measures, of unrelated constructs, are not correlated (DeVellis, 2012). The clinical scales were compared with the scales on the previously mentioned measures to determine whether the theoretically similar scales had high levels of correlation. The data showed scales that were most theoretically similar showed the highest degree of correlation, while scales that were similar, but focused on different aspects of the clinical concept had a medium to high correlation, demonstrating the validity of the measures. Furthermore, scales were compared to other dissimilar scales, and showed scales that were dissimilar provided low correlations. Overall, the PAI-A clinical scales demonstrated a high degree of convergent and discriminant validity for all scales.

Table 3.1
Personality Assessment Inventory – Adolescents, Scales

PAI-A Scales	Scale Description	Scale Interpretation
Validity Scales		
Inconsistency (ICN)	Measures random responding patterns.	<69T: responses are consistent 69-77T: some inconsistency in responding ≥78T: high inconsistency in responding
Infrequency (INF)	Measures atypical response patterns due to carelessness, confusion, or reading difficulties.	<66T: appropriate attention to item content 66-78T: some idiosyncratic responses ≥79T: high idiosyncratic responding
Negative Impression (NIM)	Tendency to portray oneself as having a greater level of psychopathology than is currently present.	<77T: little evidence of negative distortion 77-84T: some exaggeration regarding complaints and problems ≥85T: respondent likely attempted to portray negative image of self
Positive Impression (PIM)	Tendency to portray oneself in a more favorable light, unwilling to admit any problems or difficulties.	<65T: reasonably forthcoming 65-71T: respondent portrayed positive image of self, free of some shortcomings ≥72T: respondent portrayed positive image of self, free of most shortcomings
Clinical Scales		
Somatic Complaints (SOM)	Focuses on preoccupation with health matters and somatic complaints specific to somatization and conversion disorders.	<60T: few bodily complaints 60-69T: some concern about health functioning 70-84T: significant concerns about somatic functioning, probably impairment from somatic symptoms ≥85T: chronic complaints, with fatigue and weakness
Anxiety (ANX)	Focus on phenomenology and observable signs of anxiety with an emphasis on assessment across different	<60T: few complaints of anxiety or tension 60-69T: may experience some stress and is worried, sensitive, and emotional

	response modalities.	70-80T: significant anxiety and tension ≥81T: generalized impairment associated with anxiety
Anxiety-Related Disorders (ARD)	Focus on symptoms and behaviors related to specific anxiety disorders.	<60T: little distress across many situations 60-69T: some fears and worries in various situations 70-76T: impairment associated with fears surrounding some situations ≥77T: multiple anxiety disorder diagnoses, broad impairment
Depression (DEP)	Focus on symptoms and phenomenology of depressive disorders (unipolar)	<60T: few complaints of unhappiness or distress 60-69T: unhappy, may be sensitive, pessimistic, and self-doubting 70-83T: prominent unhappiness and dyspohria ≥84T: diagnosis of major depression, feelings of hopelessness, discouragement, and uselessness, associated with suicidal ideation
Mania (MAN)	Focus on the affective, cognitive, and behavioral symptoms of mania and hypomania.	<55T: few features of mania or hypomania 55-64T: indicative of individuals who are active, outgoing, ambitious 65-72T: associated with restlessness, impulsivity, and high energy levels ≥73T: associated with mania, hypomania, or cyclothymia
Paranoia (PAR)	Focus on the symptoms of paranoid disorders and more enduring characteristics of paranoid personality.	<60T: associated with openness and forgiveness towards others 60-69T: associated with sensitivity, tough-mindedness, and skepticism 70-75T: overtly suspicious and hostile, distrustful of authority and of close interpersonal relationships ≥76T: associated with paranoia of potentially delusional proportions
Schizophrenia (SCZ)	Focus on symptoms relevant to the broad spectrum of schizophrenic disorders.	<60T: no difficulties with relationships, attention, or concentration. 60-69T: dependent on subscale

		variation, some be withdrawn, inattentive 70-80T: feelings of isolation and alienation ≥81T: associated with an active schizophrenic episode
Borderline (BOR)	Focuses on attributes of borderline type personality functioning.	<60T: emotional stability 60-69T: associated with moodiness, sensitivity, uncertainty about life goals 70-80T: impulsive and emotional labile, feelings of being misunderstood difficulty to sustain close relationships ≥81T: personality functioning within the borderline range
Antisocial Features (ANT)	Focuses on attributes of antisocial type personality functioning	<60T: little distress across many situations 60-64T: associated with impulsivity, risk-taking behavior 65-71T: self-centeredness, unsympathetic interpersonal relationships ≥72T: associated with marked antisocial conduct
Alcohol Problems (ALC)	Focuses directly on problematic consequences of alcohol use and features of alcohol dependence.	<60T: little or no alcohol intake 60-69T: associated with some alcohol intake with some adverse consequences 70-78T: likely meet criteria for alcohol abuse ≥79T: associated with severe alcohol problems
Drug Problems (DRG)	Focus directly on problematic consequences of drug use (prescription and illicit) and features of drug dependence.	<60T: associated with infrequent drug use 60-69T: associated with regular drug use with some adverse consequences 70-88T: likely meet criteria for drug abuse ≥79T: severe drug related problems

Note: From *Personality Assessment Inventory – Adolescents, Manual,* by Moray, 2006

The Social Communication Questionnaire, SCQ. The SCQ (Rutter, Bailey, Lord, Cianchetti, & Fancello, 2007) is a reliable and valid measure of the severity of symptoms associated with ASD. It is a 40-item rating scale that is completed by the parent of an individual with ASD. It is often used for screening and diagnosis, although diagnoses of ASD should not be made solely based on this measure. It also has been recommended for use in research to compare symptom severity in individuals with ASD (Naglieri & Ozonoff, 2009).

The development of the SCQ was based on the revised version of the Autism Diagnostic Interview – Revised (ADI-R) algorithm (ADI-R; Lord, Rutter & Le Couteur, 1994). This provided operational definitions for three scales: Reciprocal Social Interaction, Language/Communication; and Restricted, Repetitive and Stereotyped Behaviors and Interests. Although these scales were not designed for DSM-5 diagnostic criteria, Frazier et al. (2013) validated the two-criteria model used in the DSM-5 with the SCQ, indicating the SCQ can also be used to measure symptom severity for individuals diagnosed under DSM-5 criteria. These are directly based on the ADI-R subscales; however, due to insufficient research into the validity of the measure for diagnostic purposes, the measure may not should not be used alone for interpretation. Instead, the SCQ should be utilized as a screening measure or for research purposes. The questions were designed to be clear, simple, and unambiguous to aid in comprehension of the items for parents. The SCQ provides two different forms: one for lifetime behavior and one for current behavior (the past three months). For the current study, the lifetime form will be utilized to examine symptom severity.

The standardization sample included 200 individuals who had participated in previous ASD studies. Of the participants, 160 had ASD, which was comprised of 83 individuals with autism, 49 with atypical autism, 16 with Asperger syndrome, 7 with fragile X anomaly but not

autism, and 5 with Rett's syndrome. There were 40 individuals with non-ASD diagnoses, including 10 with conduct disorder, 7 with specific developmental language disorder, 15 with mental retardation, and 8 with other psychiatric diagnoses. As seen in the prevalence rate of ASD, there was a high ratio of males to females in the sample, but when looking at the gender difference in scores, the males and the females had the same averages so the discrepancy was not further documented. Because the samples were from other studies, no demographic information or specific age ranges were provided for the standardization sample.

Reliability. Rutter et al. (2007) provided internal consistency data as a measure of reliability. The alpha coefficients were computed with two different subsets of their data. First, a sample of 214 children was divided into a "language" and "no language" group. Cronback's alpha coefficient for these groups ranged from .84 to .93. Then, the "language" group was divided into 4 groups based on diagnosis (autism, other ASD, non-spectrum). The alpha coefficients for these groups ranged from .81 to .92.

Validity. To determine the validity of the SCQ, a four-step process was implemented. First, a factor analysis was completed to demonstrate scale differentiation. Then a correlation between the total SCQ score and individual items and diagnosis was conducted. Third, a correlation between the SCQ and ADI-R was calculated to measure convergent validity. Finally, receiver operating characteristic (ROC) curves were applied to demonstrate divergent validity.

The factor analytic analyses were completed based on a three- or four-factor solution. Based on this analysis, it appears the four-factor solution would be more meaningful. Two of the factors strongly coincided with the Reciprocal Social Interaction domain, which accounted for 24.3% of the variation, and the Restricted, Repetitive and Stereotyped Patterns of Behavior domain, accounting for 4.5% of the variation. The communication domain was divided between

two factors: communicative deficits (8.7% of variation) and abnormal language features (5% of variation). Overall, this model accounted for 42.4% of the total variation.

Item validity also was measured through a correlation between the individual items as well as the ADI. Of the 39 items, 33 showed statistically significant differentiation. Of the items that did not show differentiation, 4 were concerned with abnormal language features. The correlation between the ADI and the SCQ were calculated as well. The correlation coefficients were statistically significant for all comparisons within and across domains.

The receiver-operating characteristics (ROC) analyses were completed, and t-tests were computed. The discriminant ability of the SCQ showed a clear discrimination between ASD and non-ASD diagnoses. Furthermore, the discrimination between autism and other ASDs was not as strong. When compared to the ADI, the SCQ showed similar levels of differentiation for autism compared to mental retardation, other ASD and non-ASD groups. Finally, the individual scales were analyzed to determine which had the most discriminative ability. The total score was the best at discrimination with the Communication and Restricted, Repetitive, and Stereotyped Patterns of Behavior domains each statistically significant, as well. The Restricted, Repetitive, and Stereotyped Patterns of Behavior alone was not good at differentiating autism from mental retardation or autism from ASD. Overall, it is best to use the SCQ Total Score. Based on this analysis, the research suggests a cutoff score of 15 or more with a sensitivity of .96 and specificity of .80 for autism compared to other diagnoses, and a sensitivity of .96 and specificity of .67 for autism compared to mental retardation. A higher cutoff (22 or more) was required to differentiate ASD from other ASD diagnoses, with a sensitivity of .75 and a specificity of .60.

Concurrent validity was assessed using the ADI-R. Pearson intercorrelations for the Reciprocal Social Interaction domain for the two measures was .92, for the Communication

domain, the Pearson intercorrelation was .73, and for the Restricted, Repetitive, and Stereotyped Patterns of Behavior domain, it was .89. The convergent validity evidence was measured as well, with the Total Scores for the SCQ and ADI-R correlating at .78. There were no correlations when varied by age, gender, language ability, and performance IQ. Furthermore, the items correlated at a medium level when the ADI-R scores of 1, 2, and 3 were correlated with a SCQ score of 1 (average 69.8%) and with a SCQ score of 2 (average 68.5%). The Social and Communication domains had a high correlation with same-domain scales, and a lower correlation with different-domain, demonstrating a high level of convergent and discriminant validity. The Restricted, Repetitive, and Stereotyped Patterns of Behavior domain did not have a high same-domain correlation coefficient, and therefore, does not contrast as strongly with different-domain correlation coefficients, indicating this is not as strong of a measure as the other scales.

Procedures

The present study collected data from individuals across the United States and Canada. It was conducted with the consent of the Institutional Review board of Ball State University, obtained in April, 2015. Flyers were sent out to various schools, mental health clinics, and local and national autism organizations across the country, asking parents to contact researchers about participation in the study. These were identified as sources for recruitment based on connections at the locations or pre-existing avenues for recruitment for research.

Upon contacting researchers, parents and individuals were provided with detailed information regarding how to participate in the study and were asked to provide a mailing address if they wished to continue. The information sent to families included the IRB approval number, the purpose of the study, inclusion and exclusionary criteria for the study, what the

participants are expected to do, potential harm posed by the study, and contact information for Elizabeth Hooks, the primary clinician and lead researcher, and Liz Freeman-Floyd, the co-leading researcher, who administered and scored all protocols for the proposed study. Parents and participants were informed their child's information would be confidential and names would not be released. In addition, if the child no longer wanted to participate, parents were informed they could withdraw from the study at any time, without penalty.

Participants were sent a packet with all relevant information included. Parents were informed they would be able to call or email the researchers with questions regarding the information included in the packet. Emails were deleted from the inbox and trash and were not connected to the collected data. The first page of the packet was a list of instructions, with a checklist of forms to complete. Participants were asked to provide verification of their diagnosis and reading level in the form of a school report, licensed psychologist report, or a physician's report. Participants were provided information regarding the benefits and risks of participation in the study, and then, asked to sign an informed consent form (Appendix B and C). For participants over the age of 18, they were asked to sign an adult informed consent (Appendix D). If the participant was18 or under, the participant was asked for their assent and to allow the parent or guardian to complete the SCQ and assist in verifying background information (Appendix C). Parents were asked to complete the Social Communication Questionnaire lifetime form (SCQ) to assess the severity of symptoms of ASD experienced by the participant over their lifetime. The participant was asked to complete the PAI-A. When the forms were completed, participants were instructed to place all the forms into a pre-paid self-addressed envelope and sent to Ball State. Once the researchers received the PAI-A and diagnosis and packet completion were verified, the participant and their parent were thanked for their participation and sent a $30

gift card of their choice. At the completion of data collection, participants were entered into a raffle for one of six $100 Visa gift card.

After the data were collected, the data were stored at Dr. David McIntosh's office on the Ball State Campus, Elizabeth Hooks' dissertation chair and advisor. The results were locked in a file cabinet. Participant names were recorded on informed consent and/or assent forms, which were stored in a locked cabinet in a locked office for the duration of the study. The informed consent and/or assent forms were kept in separate files from the participant's response protocols provided medical or psychological records and demographic forms. Copies were made of any provided records. However, all provided records were de-identified (e.g., blacked out). Only participant subject numbers (e.g., 0001, 0002, 0003) were recorded on response forms used during assessments; results were scored and entered into a secure database program on an encrypted, password-protected dedicated computer, in a locked office. Only authorized research program personnel were allowed to access the cabinet or computer. Because all information and data were de-identified there is no way to link an individual participant number with his/her informed consent and/or assent forms or data. Therefore, the researchers would not be able to provide any of the participant's assessment data, demographic information, provided medical or psychological records, or any other information if requested by the guardian or participant in the future.

The PAI-A was scored using the Personality Assessment Inventory – Adolescent Software Portfolio (PAI-A SP). The software was loaded onto an encrypted, password-protected dedicated computer, in a locked office. Only participant subject numbers was recorded on the PAI-A SP. After response scoring was completed, t-scores were entered into SPSS for statistical analysis.

Chapter Summary

The purpose of this study was to conduct a profile analysis to determine if adolescents with ASD display different patterns of elevations on the PAI-A. Specifically, the PAI-A has several clinical scales and subscales, which are based on clinical constructs, associated with various mood and thought disorders. This chapter described the participants and methods that were used for the present study. The present study used the data from the PAI-A community and clinical standardization samples. Adolescents with ASD provided documentation of their reading level, to ensure they would be able to read and comprehend the questions on the PAI-A. Participants received a packet of forms to complete for the study, including informed consent documents, demographic questionnaires, the SCQ, and the PAI-A. Their responses were then scored, analyzed, and compared to the two standardization groups included in the PAI-A. Furthermore, this section examined the standardization and reliability of the measures to be used in the present study.

CHAPTER IV

Results

Chapter IV contains the statistical analyses of the data collected in the present study, specifically a profile analysis. Demographic information (e.g., age, gender, ethnicity, diagnosis, etc.) from the questionnaire was entered into SPSS. The t-scores for the clinical scales of the PAI-A were calculated and imported into SPSS. For the community and clinical group, the means, standard deviations, sample size, and the correlation coefficients from the intercorrelation matrix (obtained from the PAI-A manual) also were entered into SPSS. The independent variable was group membership for the ASD group, community sample group, and clinical group. The dependent variables were the t-scores on the clinical scales.

Descriptive Statistics

Results from the PAI-A for each participant were analyzed and initial descriptive statistics were computed using the Statistical Package for the Social Sciences (SPSS) 22.0 program. Means, standard deviations, and ranges of the clinical scales were computed for the total sample and are presented in table 4.1. The clinical scales are t-scores, with a mean of 50 and a standard deviation of 10, standardized based on the community sample. However, the PAI-A also provides a variety of other profiles, which can be used to compare an individual's profile to a profile of someone with a particular clinical disorder. The clinical sample is comprised of individuals with various disorders, resulting in a unique profile that can be used to compare an

individual to a clinical population, or a specific population through the reference comparison test manual (Morey, 1991).

Table 4.1

Means, Standard Deviations, and Ranges of Personality Assessment Inventory – Adolescents, Clinical Scales for Total Sample (n = 60)

PAI-A Clinical Scales	Mean	SD	Range
Somatic Complaints	56.92	16.68	40-101
Anxiety	54.65	13.49	34-87
Anxiety-Related Disorders	53.21	11.68	36-79
Depression	57.13	13.60	36-97
Mania	51.00	10.91	29-77
Paranoia	52.97	12.75	29-80
Schizophrenia	55.58	14.66	34-91
Borderline	53.63	12.87	32-82
Antisocial Features	48.78	9.35	35-66

The descriptive analysis of each group shows differences between the groups means, standard deviations, and ranges. Means, standard deviations, and ranges were calculated for the ASD group, community group, and clinical group and are presented in Table 4.2. The community sample group's means for all clinical scales were slightly below the mean and within the non-clinical range, and the standard deviations are slightly narrower than the standard deviation for T-scores. This indicates the community sample is fairly normally distributed. Anxiety-related disorders and borderline scales had the lowest means and narrowest standard deviations. Anti-social features and anxiety scales had low means, but typical standard deviations. Although some means were lower, they were all within half of one standard deviation from the mean. Although not perfectly distributed, the sample appears to adequately represent the community sample as a whole. The range for this sample spans from non-clinically

Table 4.2

Means, Standard Deviations, and Ranges of Personality Assessment Inventory – Adolescents, Clinical Scales for Autism, Clinical, and Community Samples

	Autism Sample (n=20)			**Clinical Sample (n=20)**			**Community Sample (n=20)**		
PAI-A Clinical Scales	**Mean**	**SD**	**Range**	**Mean**	**SD**	**Range**	**Mean**	**SD**	**Range**
Somatic Complaints	57.20	16.97	40-99	64.25	20.14	40-101	49.30	7.31	40-67
Anxiety	56.20	14.069	34-79	60.90	13.66	37-87	46.85	8.54	35-69
Anxiety-Related Disorders	56.20	12.26	36-77	56.95	12.06	36-79	46.10	6.94	40-68
Depression	59.65	12.23	39-78	62.45	15.50	44-97	49.30	9.13	36-73
Mania	51.25	11.81	34-72	54.40	10.94	34-77	47.35	9.18	29-68
Paranoia	52.20	13.98	29-80	57.50	13.68	38-80	49.20	9.23	31-66
Schizophrenia	58.90	15.85	34-91	60.30	15.13	39-91	47.55	9.16	34-69
Borderline	54.50	14.17	32-82	60.05	13.06	37-81	46.35	6.58	35-62
Antisocial Features	45.70	8.14	35-64	54.95	8.71	42-66	45.7	8.34	38-63

significant to 2 standard deviations above the mean. The percentage of individuals who scored in the clinically significant range is reported in Table 4.3. The only clinically significant score was on the depression scale, with 1 out of 20 participants scoring above 70T.

The clinical sample group's means, standard deviations, and ranges for all clinical scales are also reported. The means were about .5 to 1.5 standard deviations above the average, and the standard deviations are 1-2x wider than the standard deviation for the t-scores. This indicates there is more scatter among the clinical sample. The variety of scores is to be expected based on a wide variety of profiles that comprises the overall scale. Somatic complaints, anxiety, depression, borderline, and schizophrenic scales are all at least one standard deviation above the mean, with somatic complaints, which is the highest, at a mean t-score of 64.25. Anti-social features and mania scales had the lowest means, with standard deviations of 8-10, but they were still above 50t. This sample matches the general pattern of highs and lows on the clinical profile provided in the reference comparison test manual (Morey, 1991). Therefore, this appears to be a representative sample of the overarching standardization sample for the clinical profile. The range for this sample spans from non-clinically significant to 5 standard deviations above the mean. The percentage of individuals who scored in the clinically significant range is reported in Table 4.3. All clinical scales had participants in the clinically significant range, except for the anti-social features scale, which had a maximum of 66t.

The autism sample group's means, standard deviations, and ranges for all clinical scales are reported as well. The means are all within one standard deviations of the mean, and the standard deviations are slightly wider than the standard deviation for the t-scores. This indicates there is more variation than the community sample, but less than the clinical sample overall. This would be consistent with the fact that the clinical sample has a wider variety of disorders, and the

ASD group is looking at only Autism Spectrum Disorder. Somatic complaints, depression, and schizophrenic scales are all close to 1 standard deviation above the mean. Anti-social features had the lowest mean, which was exactly the same as the community sample mean. The range for this sample spans from non-clinically significant to nearly 5 standard deviations above the mean. The percentage of individuals who scored in the clinically significant range is reported in Table 4.3. All clinical scales had participants in the clinically significant range, except for the anti-social features scale, which had a maximum of 64t.

Table 4.3

Percentage of Clinically Significant Scores on the Personality Assessment Inventory – Adolescents, Clinical Scales for Autism, Clinical, and Community Samples

PAI-A Clinical Scales	ASD	Clinical	Community
Somatic Complaints	20%	35%	0%
Anxiety	25%	20%	0%
Anxiety-Related Disorders	15%	10%	0%
Depression	25%	30%	5%
Mania	5%	10%	0%
Paranoia	10%	20%	0%
Schizophrenia	25%	30%	0%
Borderline	10%	25%	0%
Antisocial Features	0%	0%	0%

Assumptions

Before running a profile analysis, assumptions were evaluated. Homogeneity of variance-covariance does not require evaluation for samples of the same size (Tabachnick & Fidell, 2012). Violation of the assumption of normality typically only occurs when the sample sizes are drastically disproportionate and there are a higher number of dependent variables than participants per group (Tabachnick & Fidell, 2012). There are 9 dependent variables (clinical

scales) and 20 participants per group, and the groups are of equal size, and matched for age, sex, and ethnicity. Therefore, normality is unlikely to be violated, as well. To evaluate linearity, which is especially important for the parallelism test, skewness and kurtosis were examined. Skewness refers to the symmetry of the distribution, while kurtosis refers to the peakedness of the distribution (Tabachnick and Fidell, 2001). Overall, clinical and treatment scales had a minimal positive skew, ranged 1.185 to .318. A visual inspection of the histograms indicates the data is normally skewed. The overall kurtosis of the clinical scales ranged from .466 to -1.139, indicating a normal distribution. In addition, Q-Q plots were examined and all scores fell on a straight line, with the exception of the alcohol scale.

Profile Analysis

A profile analysis was conducted to compare the ratings of adolescents with Autism Spectrum Disorder, other clinical diagnoses, and no clinical diagnoses, on the PAI-A at the composite level. Profile analysis measures multiple dependent variables on one measurement scale using a one-way multivariate analysis of variance (MANOVA; Tabachnick & Fidell, 2012). The dependent variables for the present study are the composite scale scores (mean = 50, SD = 10) from the PAI-A. All scale scores have the same meaning, which is a requirement for this type of analysis. The profile analysis will compare the mean scores for each group to determine whether any patterns between scores and group are present. Two tests are performed to evaluate any differences in scores: the parallelism test and the levels test.

Parallelism test. The first question answered in a profile analysis is whether different groups display the same pattern of highs and lows across the dependent variables. A one-way MANOVAs is used to evaluate the slopes of adjacent parts of the measure to determine whether the profiles are parallel (Tabachnick & Fidell, 2013). The order of variables should be arbitrary

for a profile analysis. The differences between scores indicate whether the profiles are parallel. A parallel profile would be present if no adjacent segments yielded significant differences between groups.

Levels Test. The second question answered in a profile analysis is whether one group scores higher or lower on average across dependent variables when compared to the comparison groups, regardless of the results of the first question. A univariate test, which is equivalent to a between-subjects main effect in repeated-measures ANOVA, will be used to evaluate this question (Tabachnick & Fidell, 2013). This will tell us whether the mean scores from the ASD group, as a set, are significantly different from the mean scores from the community and clinical sample.

Research Questions:

1. When conducting a profile analysis of the PAI-A clinical scales:
    a. Do individuals with ASD display the same pattern of highs and lows (Parallelism Test) across the clinical scales as the community sample group?
    b. Do individuals with ASD display the same pattern of highs and lows (Parallelism Test) across the clinical scales as the clinical group?
2. Regardless of whether the profiles are parallel:
    a. Does the ASD group, on average score higher or lower (Levels Test) across the PAI-A clinical scales, as a set, compared to the community sample group?
    b. Does the ASD group, on average score higher or lower (Levels Test) across the PAI-A clinical scales, as a set, compared to the clinical sample group?

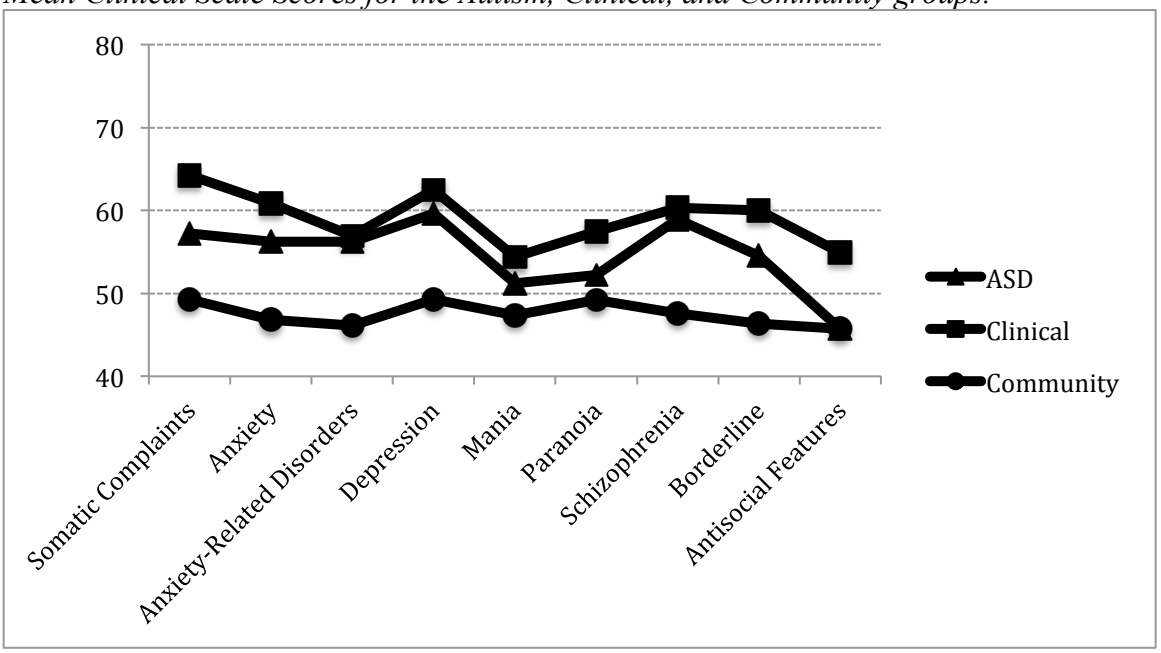
The parallelism test was used to analyze the first question. An alpha level of .05 was set prior to analysis. Each variable was entered into the analysis in the order presented on the PAI-A

protocol. The test of parallelism was significant for the comparison between the ASD sample and community sample $F(8, 31) = 3.738$, $p = .004$ (see figure 4.1), indicating the ASD sample and the community sample did not display similar patterns of highs and lows across the PAI-A scales. Omega-squared ($\omega^2 = .341$) fell in Cohen's (1988) medium range, indicating ASD had a medium effect on the profile on the PAI-A, compared to the community sample.

The test of parallelism was significant when the ASD sample was compared to the clinical sample (see Figure 4.1). This indicates the ASD sample and the clinical sample do not display similar patterns of highs and lows across the PAI-A scales $F(9, 30) = 208.923$, $p < .05$. These results indicate the ASD sample displayed a unique pattern of highs and lows across the PAI-A scales for both clinical and community samples. Omega-squared ($\omega^2 = .125$) fell in Cohen's (1988) small range, indicating ASD had a small effect on the profile on the PAI-A, compared to the clinical sample.

Figure 4.1

Mean Clinical Scale Scores for the Autism, Clinical, and Community groups.



The levels test analyzed whether the ASD group were higher or lower than the community or clinical groups. The analysis found that the ASD group was significantly higher than the community group $F(1,38) = 1297.304$, $p = .001$. This indicates that the pattern of highs and lows for the mean scores for the ASD group and the community group is significantly different. Omega-squared ($\omega^2 = .119$) fell in Cohen's (1988) small range, indicating ASD had a small effect on the profile on the PAI-A, compared to the community sample.

In addition, the ASD group was significantly higher than the clinical group $F(1,38) = 129,441.185$, $p = .001$. This indicates that the pattern of highs and lows for the mean scores for the ASD group and the clinical group is significantly different. Omega-squared ($\omega^2 = .012$) fell in Cohen's (1988) small range, indicating ASD had a small effect on the profile on the PAI-A, compared to the clinical sample.

Follow-up Analyses

Because the test of parallelism and levels were significant, a follow-up analysis was conducted to determine which scales specifically were significantly different between the three groups. A series of t-tests were analyzed and results are presented in Table 4.4. Because multiple t-tests were conducted, a significance value of .005 (.05 divided by the number of t-tests) was calculated as a more stringent value in order to control for alpha slippage (Type I error). It was hypothesized that the ASD group would be more elevated than the community group. Therefore, a one-tailed significance test was completed for each t-test for the community sample, but a 2-tailed test was completed for the clinical sample. When compared to the community sample, the ASD sample scored significantly higher on the anxiety related disorders scale $F(38,10.5) = 12.649$, $p=.001$, depression scale $F(38,10.35) = 3.764$, $p = .002$, and schizophrenia scale $F(38, 11.35) = 5.625$, $p = .0045$. The r-value for the anxiety related disorders scales ($r=.475$) fell in the

medium range, indicating a medium effect on the presence of ASD compared to a community sample. The r-value for the depression scales (r=.44) fell in the medium range, indicating a medium effect on the presence of ASD compared to a community sample. The r-value for the depression scales (r=.41) fell in the medium range, indicating a medium effect on the presence of ASD compared to a community sample.

Table 4.4

Follow-up t-test Results for the PAI-A Clinical Scales, ASD and Community Sample p=0.005

PAI-A Clinical Scales	**F**	**Significance**	**Mean Difference**
Somatic Complaints	14.299	0.0315	7.90
Anxiety	7.843	0.0075	9.35
Anxiety-Related Disorders	12.649	0.001	10.50
Depression	3.764	0.002	10.35
Mania	2.517	0.1255	3.90
Paranoia	4.379	0.214	3.00
Schizophrenia	5.625	0.0045	11.35
Borderline	10.770	0.0125	8.15
Antisocial Features	.062	0.5	2.61

The differences between the clinical and ASD samples were evaluated with a series of t-tests as well. Results are presented in Table 4.5. Because multiple t-tests were conducted, a significance value of .005 (.05 divided by the number of t-tests) was calculated as a more stringent value in order to control for alpha slippage (Type I error). When compared to the clinical sample, the ASD sample scored significantly lower on the antisocial features scale $F(38,2.66) = .540$, $p=.001$. The r-value (r=.49) fell in the medium range, indicating a medium effect on the presence of ASD compared to a clinical sample.

Figure 4.2

Mean Clinical Scale Scores for the Autism, Clinical, and Community groups with follow-up analysis

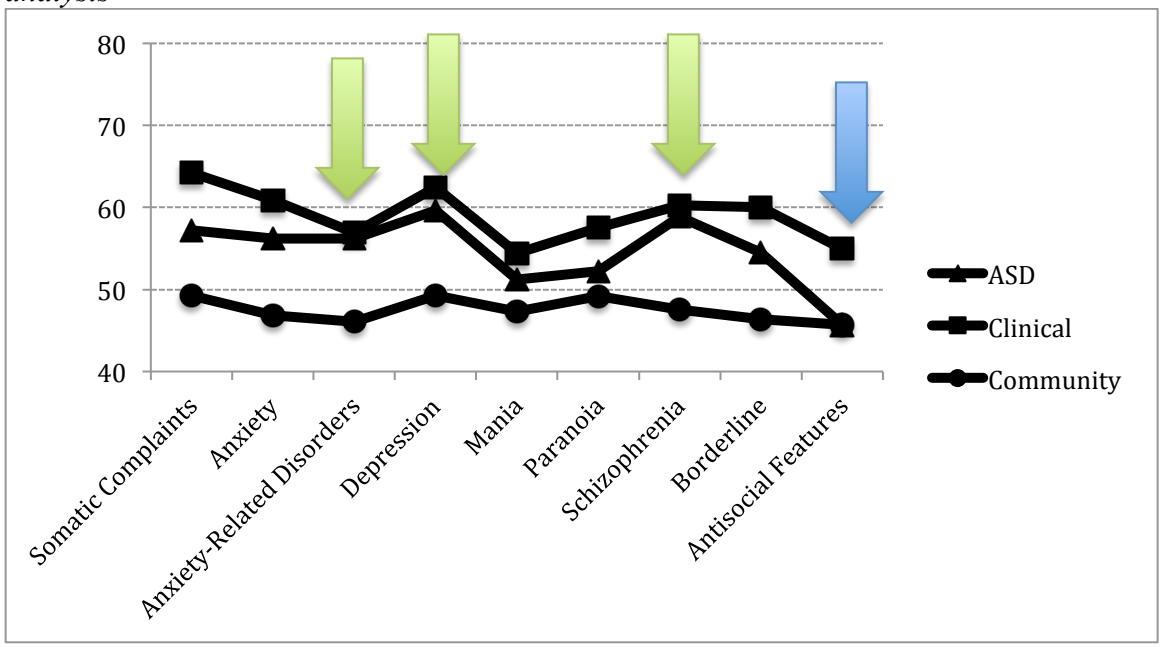


Table 4.5

Follow-up t-test Results for the PAI-A Clinical Scales, ASD and Clinical Sample

PAI-A Clinical Scales	F	Sig (2-tailed)	Mean Difference
Somatic Complaints	.923	.239	-7.05
Anxiety	.270	.291	-4.70
Anxiety-Related Disorders	.199	.928	-0.35
Depression	.400	.530	-2.80
Mania	.636	.387	-3.15
Paranoia	.004	.233	-5.30
Schizophrenia	.010	.777	-1.40
Borderline	.102	.206	-5.55
Antisocial Features	.540	.001	-9.25

Chapter Summary

This chapter presented the results of a profile analysis for the PAI-A, comparing a sample of adolescents with ASD to a matched community sample and clinical sample, from the original standardization sample. Descriptive statistics were reported, including means, standard deviations, and ranges, for each sample. Two research questions were then answered. The first, a parallelism test, determined there were significant differences in the patterns of scores between the ASD sample and both the community and clinical samples. The second question, a levels test, determined that the ASD group scored higher on several clinical scales compared to the community group. It also determined that the ASD group scored lower on one scale, antisocial traits, compared to the clinical group.

CHAPTER V

Discussion

The present study examined whether the Personality Assessment Inventory – Adolescents (PAI-A) could be used to identify a unique profile for adolescents with Autism Spectrum Disorder. The PAI-A is a personality assessment which measures several different aspects of mood and personality traits, and is useful in the assessment and evaluation of a variety of psychological disorders, including anxiety, depression, schizophrenia, and ADHD (Morey, 2007). To determine whether a unique PAI-A profile exists, the study first determined whether the pattern of highs and lows across the clinical scales was similar or dissimilar from the community and clinical standardization samples. The study then examined whether adolescents with ASD scored higher or lower across the PAI-A clinical scales on average, compared to the community and clinical standardization samples. Previous research on the topic was limited, however, Ozonoff et al. (2005) found elevations on the depression, social discomfort, repression, and introversion scales of the MMPI-2 when administered to adults with ASD. The present study is the first study to evaluate a the use of the PAI-A for adolescents with ASD, and one of the few studies to evaluate the use of personality assessments in general with the autism population.

Summary of Results and Implications

Descriptive analysis of the data indicated the samples matched normative data. Means, standard deviations, and ranges were similar to the measure's mean score and standard deviation (M=50; SD =10).

Research Question One

The objective of the present study was to compare the performance of adolescents with ASD on the PAI-A to the performance of the community and clinical standardization sample. A profile analysis noted significant differences between the overall pattern of highs and lows between the ASD sample and both the community and clinical samples. This indicates there is a difference in the pattern of responses given by adolescents with ASD, compared to adolescents without ASD, as well as adolescents with other clinical diagnoses. This finding is consistent with other research, indicating significant differences between personality profiles of individuals with ASD compared to a non-clinical population (Ozonoff et al., 2005). In addition, this is the first study to analyze differences between an ASD population and a clinical population. These results may indicate that there is a unique ASD profile, separate from profiles of adolescents with other types of psychological disorders.

Research Question Two

The study also looked to determine whether adolescents with ASD score higher or lower across the PAI-A clinical scales compared to the community and clinical standardization sample. As demonstrated by the levels test, individuals with ASD score significantly higher than individuals in the community sample on the PAI-A. They also scored significantly lower than individuals in the clinical sample. These results provide support for the idea of a unique profile for individuals with ASD on this measure, and further supports previous research. Previous

research suggested significant increases in overall mean scores for individuals with ASD (Ozonoff et al., 2005).

Follow-up Analyses

When looking at individual scales, there are significant differences between the ASD group and the community and clinical samples. The results of the study indicated individuals with ASD have higher mean scores than the community group on the anxiety-related disorders, depression, and schizophrenia, but they have a lower mean score than the antisocial features scale when compared to the clinical group. This suggests that there is not only a unique profile for adolescents with ASD compare to the community sample, but that there is possibly a unique profile specific to individuals with ASD. Low scores on the antisocial features scale may differentiate an ASD profile from other clinical profiles.

Clinical Implications

The results of the current study have clinical implications for the assessment of individuals with ASD. Although the scores for the ASD sample was significantly higher than the community sample, the mean t-scores on the clinical scales for the ASD sample still fall below two standard deviations of the community sample mean. The elevations found are not always clinically significant, simply elevated in comparison. Furthermore, the ASD mean t-scores are lower than the means for the clinical sample. One explanation for this is individuals with ASD experience some aspects of the symptoms related with other disorders, but not the full range of the symptoms experienced with each of those disorders. For example, individuals with ASD may experience concrete thought processes that could be described as disordered thoughts. Individuals with ASD would not experience other aspects of schizophrenia, however, such as delusions or paranoia. Individuals with ASD may experience symptoms that look similar to

obsessive-compulsive disorder, such as repetitive thoughts or behaviors, but they engage in these for the enjoyment of the thought or activity, rather than from a need to reduce anxiety. That would elevate the scales to some degree, however, because each of those scales is not specifically measuring autism spectrum disorder, they are not as elevated as the clinical sample, which includes individuals with the specific disorders being measured by the scales.

The pattern of high and low scores for ASD indicates that there may be a specific profile that is capable of differentially diagnosing ASD from other disorders. When compared to the community sample, individuals with ASD had significantly higher levels of anxiety-related disorders, depression, and schizophrenia. Furthermore, the anti-social features scale was significantly lower than the clinical sample, with a mean that exactly matched the community sample. Comparing the ASD profile to the clinical and community standardization profiles would be helpful in determining whether the profile indicates ASD, as there are significant differences when compared to both the community and clinical profiles. The use of the PAI-A can be helpful in instances where differential diagnosis is difficult. It can also be used as an effective screening tool for comorbid diagnoses. Although the pattern may indicate the presence of ASD, but it is not unique enough to be used without other measures that directly assess for ASD, such as the ADOS-2 or ADI-R. Additional research into the profile of subscales may provide a more unique profile analysis, as well as looking at the treatment and validity scales. Ozonoff et al. (2005) found that one of the validity scales on the MMPI-2 was significantly higher for individuals with ASD compared to the standardization sample. The validity scales were not evaluated in the present study due to sample size restrictions, but additional scales on the PAI-A may be useful in identifying a profile specific enough to differentially diagnose individuals with ASD from other disorders independent of other measures.

Although the PAI-A should not be used alone to diagnose ASD, the results of this study indicate that it may be a useful tool for identifying comorbidity in individuals with ASD. Because the mean t-scores for ASD group are less than 1 standard deviation above the mean, a clinically significant score would indicate the presence of those specific symptoms. For example, although the depression score is significantly more elevated compared to the community profile, it is not in the clinically significant range. An individual experiencing depression would likely have a clinically significant t-score on the depression scale. Similarly, an individual with anxiety-related disorders, such as obsessive-compulsive disorder, may score in the clinically significant range for that scale, indicating comorbidity. Because the profile for individuals with ASD was still below clinical significance, any clinically significant or elevated, yet subclinical, scores would be indicative of that disorder.

The PAI-A may be helpful in identifying comorbid disorders in individuals with ASD, leading to more successful treatment and interventions. Comorbidity is difficulty to diagnose in individuals with ASD, as they are often poor reporters of internal experiences. Clinicians often struggle to differentiate symptoms of ASD from other disorders. For example, individuals exhibiting odd thought patterns may be diagnosed with schizophrenia, when the thought patterns are actually a symptom of ASD, who have literal thought patterns. The use of the PAI-A would provide clinicians with a way to identify whether symptoms are related to ASD, as a result of the individual's profile lining up with the ASD profile, or whether symptoms are more intense than what would be expected for individuals with ASD. The PAI-A would at least provide an opportunity to further interview individuals with ASD who endorse critical items or show elevations on specific scales. Many of the scales showed slight elevations that were not in the clinically significant range. Practitioners should use these slight elevations as an screening

measure to further evaluate these concerns. Some social anxiety is often identified in individuals with ASD (Bellini, 2006), as they are unsure of how to interact appropriately with their same-aged peers. However, some individuals with ASD have symptoms of social anxiety severe enough to constitute an additional diagnosis of social anxiety. Depending on the elevation of the schizophrenia scale (social detachment subscale) and the anxiety-related disorders scale (phobia subscale), clinicians can collect data on the clinical significance of the individual's symptoms. Individuals with ASD also have difficulty articulating pain and discomfort. Elevations on the somatic complaint scale could indicate the presence of medical concerns the individual often feels, but is not able to communicate. Identification of comorbid diagnoses would then provide guidance to clinicians to best provide medical, cognitive, and behavioral interventions to individuals with ASD.

To best evaluate the presence of ASD or comorbid diagnoses, it is helpful to understand why certain elevations were present in the ASD group. When compared to the community sample, the anxiety-related disorders, depression, and schizophrenia scales were elevated. The Anti-social features scale matched the community sample and was significantly lower than the clinical sample.

The anxiety-related disorders scale is made up of three subscales: obsessive compulsive, phobia, and traumatic stress. The current study did not analyze these subscales, but they are helpful in understanding the significant elevations for the ASD group. Individuals with ASD often exhibit symptoms that appear similar to obsessions and compulsions, such as intense restricted interests and repetitive behaviors. Individuals with ASD also have symptoms similar to social phobia, such as being afraid of novel social situations or large crowds of people. In fact, social phobia is heavily emphasized on items for the phobia subscale, as it is a common phobia

among adolescents. The traumatic stress subscale may be elevated for individuals with ASD due to increased rates of abuse among individuals with ASD (Turk, Robbins, & Woodhead, 2005). For example, something that may be a small problem to a neurotypical individual may be a large stressor to an individual with ASD, causing them significant stress. The PAI-A was not designed to differentially diagnose ASD, but this scale in particular is able to identify specific symptoms commonly associated with ASD.

The depression scale was also elevated compared to the community sample. This scale measures the cognitive, affective, and physiological aspects of depression. Specifically, the scale is measuring flat or negative affects, negative thoughts, and physiological disturbances in sleep, appetite, and energy level. Due to increased social demands during adolescence, especially in the middle school years, many adolescents' experience disruptions in friendships, as they are unable to keep up with the complex and nuanced social demands from their peers. These daily struggles with peer interactions may lead adolescents with ASD to have increased negative thoughts (Park et al., 2012) The affective aspects of depression may mirror feelings of dissatisfaction often experienced by adolescents with ASD, as social demands increase and lead to difficulties maintaining friendships. Furthermore, adolescents with ASD may experience difficulty with transitioning between tasks or difficulty starting difficult tasks, similar to individuals who have a lack of energy as measured in the physiological subscale.

The schizophrenia subscale measures psychotic experiences, social detachment, and thought disorders. Individuals with schizophrenia may experience these symptoms due to delusions or hallucinations, but individuals with ASD may experience similar symptoms with significantly different underlying causes. Individuals with ASD have deficits in theory of mind (Peterson, Wellman, & Slaughter, 2012), which impacts their ability to understand their

internal thought processes. Items measuring thought disorders look at confusion, disorganized thoughts, and difficulty concentrating or attending to relevant stimuli in the environment. Again, individuals with ASD often experience difficulties interpreting social situations (Bellini, 2004), experiencing confusion and difficulty following complex conversations, common among adolescents. Social detachment looks at symptoms related to feeling isolated, uncomfortable, and awkward in social situations. This is a core symptom of ASD (APA, 2013), and is particularly heightened during adolescence due to increased social demands.

One scale, anti-social features, was significantly lower compared to the clinical sample, indicating no elevation for individuals with ASD. The subscales include anti-social behaviors, egocentricity, and stimulus-seeking behaviors. Overall, elevations on this score indicate a lack of anxiety and depression, as well as a reckless disregard for rules. Individuals with ASD tend to follow rules explicitly and become frustrated when others do not follow the rules. In addition, elevations in anxiety and depression in the ASD profile would directly contradict the lack of anxiety and depression measured in this scale. The anti-social scale also measures sensation-seeking behavior and a low tolerance for boredom. However, individuals with ASD struggle to make predictions about their environment and tend to be more comfortable in easily predictable environments. As a result, a significantly lower average t-score on this scale would be expected for individuals with ASD.

Several scores were not significantly different from either the community or clinical group. These scales are: somatic complaints, anxiety, mania, paranoia, and borderline. Some scales were unexpectedly non-significant, like the anxiety scale, but others were more expected, such as somatic complaints, mania, paranoia, and borderline. Individuals with ASD do not typically have somatic complaints, heightened levels of energy similar to mania, or symptoms of

paranoia. The borderline scale measured emotional reactiveness, identity crisis, and self-harm. Again, these symptoms are not commonly seen in individuals with ASD (APA, 2013).

The results of this study are applicable to a wide range of individuals. Data were collected from across the United States and included one participant from Canada. The samples from the community and clinical standardization samples were also matched for age, sex, and ethnicity. This decreases the likelihood that differences in t-scores were due to age, sex, and ethnicity increasing the external validity of the findings. Furthermore, other studies have not controlled for these variables when evaluating personality profiles for individuals with ASD. This study significantly adds to the literature and provides substantial support for the potential of using personality assessments to diagnose ASD and when identifying comorbid conditions.

Although the results of this study provide a high degree of validity across a wide population, only higher functioning adolescents with ASD would be able to complete the measure and benefit from the results. One of the limitations of this measure is that it requires a 4^{th} grade reading level. Individuals with ASD may have comorbid learning disabilities or struggle to comprehend abstract information, such as statements related to emotions, thoughts, or analogies. The utility of the measure is therefore restricted to individuals who are higher functioning. This can be very useful for adolescents who were misdiagnosed or were not evaluated in childhood. Clinicians diagnosing adolescents with complex presentations of symptoms may find this useful as a way to evaluate the presence of ASD, but clinicians diagnosing adolescents who are lower functioning or who have a reading disability may not find this measure helpful during an evaluation.

Limitations of the Study

The present study has several limitations. The study will not explore the construct validity of the PAI-A. Although Morey (2007) provided studies on the PAI-A's construct validity with the community and clinical sample, depression and anxiety are expressed differently in individuals with ASD (Park et al., 2012). In addition, individuals with ASD tend to interpret statements literally and concretely, further questioning whether the items are measuring their intended factor for this population. Therefore, the constructs for adolescents with ASD may not be valid.

In addition, the DSM-5 (APA, 2013) diagnostic criteria were used for inclusion in the study, but will also include individuals diagnosed with autistic disorder, Asperger syndrome, and PDD-NOS. Individuals, especially adolescents, diagnosed under the DSM-IV-TR may not have been re-evaluated with the new diagnostic criteria, limiting the sample pool and potentially creating a confounding variable. Although the diagnostic criteria between the DSM-IV and DSM-5 are not identical, research has shown that it is reasonable to assume these individuals will also be identified as having ASD. However, individuals with PDD-NOS are less likely to qualify under the new diagnostic criteria for Autism Spectrum Disorder, compared to individuals with Autistic Disorder or Asperger's disorder. Mayes, Black, and Tierney (2013) showed individuals with a diagnosis of Autistic disorder or Asperger syndrome have a 97 to 100% rate of identification for Autism Spectrum Disorder, but individuals with PDD-NOS have a 30% identification rate under the new diagnostic criteria. Due to difficulty with data collection, participants with educational labels and PDD-NOS diagnoses were allowed to participate. One participant had a PDD-NOS diagnosis, and four others were accepted into the study with an educational label. Future research should have stricter guidelines.

Recommendations for Future Research

The current study presents initial information about a profile for individuals on the autism spectrum, however, future research is needed to expand upon these initial findings. Studies looking at profiles for individuals with ASD on personality assessments are limited. More studies are needed to fully establish the clinical utility of this study's results. In addition, the current study had limited sample size, minimizing the number of scales that can be analyzed. Future research, with a larger sample size, is recommended to analyze other scales on the PAI-A.

Different subsets of the ASD population also should be evaluated to determine if more specific profiles may be identified. Research on the gender difference between males and female with ASD indicate differences in symptom presentation. Therefore, looking at differences between males and females profiles may be valuable. This was not examined by the current study and gender was controlled across samples. Symptom presentation also changes across the lifespan. Therefore, a comparison of adolescents on the PAI-A may be compared to adults with ASD on the PAI, the adult counterpart to the PAI-A.

Furthermore, the proposed study excluded participants who have a 3rd grade reading level or lower, limiting the generalizability to high-functioning individuals with ASD. Due to the nature of self-report measures, it is necessary for participants to have a 4th grade reading level to complete the PAI-A. This limits the utility of the profile analysis to only those with high functioning ASD and is not representative of the ASD population as a whole. Future research could look to determine whether reading the measure to individuals with lower grade reading levels would

Chapter Summary

In conclusion, the present study examined the presence of a personality profile for adolescents with Autism Spectrum Disorder on the Personality Assessment Inventory – Adolescents. A sample of adolescents with ASD was compared to a matched community and clinical sample from the standardization sample used for the PAI-A. The results found a unique profile for individuals with ASD, with regards to the pattern of scores on the scale, as well as the level of scores for each scale. Follow-up analyses also indicated that adolescents with ASD scored significantly higher on the anxiety, anxiety-related disorders, depression, and schizophrenia.

When compared to the community sample, adolescents with ASD had a different pattern of scores, and they were also higher on average. When compared to a clinical sample, adolescents with ASD had a different pattern of scores, which were lower on average. Follow-up analyses also indicated that individuals with ASD scored significantly lower on the antisocial traits scale compared to the clinical sample.

The present study added to the literature by replicating results from previous research on other personality assessments. It is also the first study to compare an ASD sample to a clinical sample. Future research should look to examine subscale scores for ASD groups compared to community and clinical samples. In addition, there may be differences between individuals with ASD of different ages, genders, or comorbid disorders.

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APPENDIX A

– Study Participant Data Sheet –

Name: _____

Current Age: _____Current Grade: _____

Primary Language: _____

Is(are) any other language(s) spoken in the home? ____ Yes ____ No

If yes, what other language(s)? _____

_____

Please circle your ethnicity:

Caucasian	Hispanic-Caucasian	Hispanic-Non Caucasian
African American	Asian American	Native American
Multi-Ethnic	Other: _____	

Please circle your gender:

Male Female

*Address: _____

_____

Preferred Gift Card: _____

Examples include: iTunes, Google Play, Amazon, Nintendo, Xbox, etc

Address is requested for receiving gift card of your choice and entry into the VISA gift card raffle only.

APPENDIX B

– Adolescent Participant Assent Form –

My name is Elizabeth Hooks. I want to learn more about different students' thoughts, feelings, and behaviors because I want to find the best ways to identify teens who may have autism spectrum disorder or other psychological disorders. If you would like, you can be in my study.

If you decide you want to be in my study, you will be asked to read and answer some questions on paper about what you think, feel, and do at different times.

By being in the study, we will give you a $30 gift card of your choice (e.g., iTunes, Amazon, Nintendo, etc.). You may also win one of six $100 VISA gift cards. After the study is over, six people will be randomly chosen to win the gift cards. Then, the VISA gift cards will be sent to them through the mail.

Other people will not know if you are in the study. I will put things I learn about you together with things I learn about other people in the study so no one can tell what things came from you. When I tell other people about my research, I will not use your name, so no one can tell who I am talking about. However, if you want to tell other people that you are in the study, it's OK for you to do that.

Because we will ask you to read a lot of questions for about an hour, you might start to have trouble paying attention after a while. You might want to talk to your parent or guardian to see what might help you do your best, like taking a few breaks.

Your parents or guardian have to say it is OK for you to be in the study. After they decide, you get to choose if you want to do it too. If you do not want to be in the study, no one will be mad at you. If you want to be in the study now and change your mind later, that is OK. You can leave the study at any time.

The telephone number you can reach me at is (765) 285-5260. You can call me if you have questions about the study or if you decide you do not want to be in the study any more.

You may want to keep a copy of this form in case you want to ask questions later.

Agreement

I have decided to be in the study even though I know that I don't have to do it. I know I can call Liz if I have questions about the study or change my mind about being in it later.

_____ _____

Signature of Study Participant Date

_____ _____

Signature of Researcher Date

APPENDIX C

– Parent/Guardian Consent Form –

Study Title

Profile Analysis of the Personality Assessment Inventory – Adolescent with Adolescents with Autism Spectrum Disorder

Study Purpose and Rationale

We are doing this study to find similarities and differences in answers given by adolescents with autism spectrum disorder (ASD), a sample of adolescents across the country, and a sample of adolescents with other disorders, such as anxiety and depression. We will compare answers given on the Personality Assessment Inventory – Adolescent (PAI-A). The information from this study will help use understand other mood disorders that often occur in adolescents with ASD, such as anxiety and depression.

Inclusion/Exclusion Criteria

In order for your child to be in our study, he or she must have a diagnosis of ASD, autistic disorder, or Asperger's disorder. Your child also must be able to read at the 4th grade level or above in order to understand the questions on the forms. We will need to see a photocopy of a letter, form or report from your doctor(s) or school(s) confirming a diagnosis or classification of ASD. We would like to see a letter, form, or report confirming your child's reading level as well.

Your child won't be able to be in the study if you can't show us any letters, forms or reports you have from your doctor(s) or school(s) documenting ASD, or if your child does not read at the 4th grade level or above.

Participation Procedures and Duration

For this study, you will be asked to do the following:

1. When you notify us that your child meets the participant inclusion criteria and wants to participate, we will mail the study documentation to you. This documentation will include:
    a. Parent/Guardian Consent Form
    b. Adolescent Participant Consent (18 years of age) or Assent (12-17 years of age) Form
    c. Participant Data Sheet
    d. Personality Assessment Inventory – Adolescent (PAI-A)
    e. Social Communication Questionnaire (SCQ)
    f. Motivation Questionnaire
    g. A postage-paid return envelope

2. We will ask you and your child to read and sign the Consent/Assent forms and complete the Participant Data Sheet. We think this will take you about 15 minutes.

3. We will ask your child to complete the PAI-A and Motivation Questionnaire survey measures. The PAI-A presents statements about thoughts, feelings, and behaviors and

asks the adolescent to decide whether each one is false, slightly true, mainly true, or very true about himself or herself. The Motivation Questionnaire presents statements about trying to be perfect and making mistakes and asks the adolescent to decide how strongly he or she agrees or disagrees with each statement. We think this will take him or her about 60 minutes.

4. We will ask you to complete the SCQ survey measure, which asks questions about past and present behaviors with "yes" or "no" responses. We think this will take you about 10 minutes.

5. We will ask you to mail the completed forms and survey measures, along with photocopies of documentation from your doctor or school confirming your child's ASD diagnosis or classification and 4th grade reading level, if available, back to us in the postage-paid return envelope provided.

6. Once we receive the completed study documentation from you, we will mail your child's $30 gift card of their choice no later than two days afterward, and we will enter your child's name in the raffle for a chance to win one of six VISA $100 gift cards.

In all, we think the evaluation will involve 60 minutes of testing and related activities.

Data Confidentiality

We will keep all study information confidential. This means we will not tell anyone your child is in the study. We will not use any personal information (such as their name) when we write or talk about the results. We will keep information from the study for 7 years after we are done writing or talking about it.

Storage of Data

We will keep all information confidential. Your child's name will only be written on your informed consent form, their assent form, and the Social and Developmental History form, which will be stored in a locked cabinet in a locked Center office until the end of the research program. Your informed consent form, assent form, and Social and Developmental History form will be kept in a separate file from your answer forms, records from your doctor(s) or school(s), and testing notes. Your and your child's name will be blacked out on all records you give to us. Only the subject number (for example, 0001, 0002, 0003) will be written on answer forms used during testing. Your child's answers will be put into a database on a password-protected computer in a locked Center office. Only research program staff will be allowed to open the cabinet or use the computer. There will be no way to link your subject number with your informed consent form or study information. We will not be able to give any of your information to you if you ask for it in the future.

Risks or Discomforts

Because your child will be asked to answer a number of questions about himself or herself, he or she may have trouble paying attention after a while. You may want to talk with him or her beforehand to find out what might help him or her pay attention during testing. For example, he

or she may want to take a few breaks. Your child may choose not to answer any question or do any activity that makes them feel uncomfortable, and he or she may quit the study at any time.

Who to Contact Should You Experience Any Negative Effects from Participating in this Study

If you feel worried or upset about the information about the study we give you, you should email Dr. David McIntosh at demcintosh@bsu.edu.

Benefits

Upon completion of the study, your child will be given a $30 gift card of their choice. They also will be entered into a raffle for a chance to win one of six $100 visa gift cards. At the end of the study, a winner will be randomly chosen. That person will be contacted regarding the prize and the gift card will be sent to their home address.

Voluntary Participation

Being in this study is completely up to you and your child, and you are free to quit the study at any time for any reason. Please feel free to ask us any questions you might have before you sign this consent form and at any time during the study.

IRB Contact Information

If you have questions about your rights as a research subject, please call or email Director, Office of Research Integrity, Ball State University, Muncie, IN 47306, (765) 285-5070 or irb@bsu.edu.

Study Title Profile Analysis of the Personality Assessment Inventory – Adolescent with Adolescents with Autism Spectrum Disorder

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Consent

I agree to my child, _____, participating in this research study, entitled "Profile Analysis of the Personality Assessment Inventory – Adolescent with Adolescents with Autism Spectrum Disorder." I have had the study explained to me and am happy with the way my questions have been answered. I have read the information about this study and agree to be in it. I understand that I will get a copy of this informed consent form to keep.

_____ _____

Signature Date

Researcher Contact Information

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APPENDIX D

- Adult Participant Consent Form -

Study Title Profile Analysis of the Personality Assessment Inventory – Adolescents with Adolescents with Autism Spectrum Disorder

What is the study about?

We want to learn about what teens with autism think, feel, and do. We want to find the best ways to see if teens have autism or other disorders. We will look at answers given on a personality test. We will compare them to answers from other teens. This information will help us understand things like anxiety and depression in teens with autism.

Can I be in the study?

To be in the study, you must have autism. Also, you need a 4th grade reading level. We will need to see something from your doctor or school saying that you have autism. We would like to see something from the doctor or school that has your grade reading level, but it's ok if you do not have it. We can find out what your grade reading level is before we begin the study.

If you don't have information from your doctor or school that says you have autism, you cannot be in the study. If you do not have a 4th grade reading level, you cannot be in the study.

What will I do in this study?

You will be asked to do these things in the study:

1. When you let us know that you meet the rules to participate and wants to participate, we will mail the study forms to you. This will include:
    a. Parent/Guardian Consent Form
    b. Adolescent Participant Consent (18 years of age) or Assent (12-17 years of age) Form
    c. Participant Data Sheet
    d. Personality Assessment Inventory – Adolescent (PAI-A)
    e. Social Communication Questionnaire (SCQ)
    f. Motivation Questionnaire
    g. A postage-paid return envelope

2. We will ask you to read and sign the Consent forms and complete the Participant Data Sheet. We think this will take you about 15 minutes.

3. We will ask you to complete the PAI-A and Motivation Questionnaire survey measures. The PAI-A presents sentences about thoughts, feelings, and behaviors and asks you to decide whether each one is false, slightly true, mainly true, or very true about himself or herself. The Motivation Questionnaire presents sentences about trying to be perfect and making mistakes and asks you to decide how strongly you agree or disagree with each sentence. We think this will take him or her about 60 minutes.

4. We will ask you to complete the SCQ survey measure, which asks questions about your behaviors with "yes" or "no" responses. We think this will take you about 10 minutes.

5. We will ask you to mail the completed forms and survey measures, along with photocopies of documentation from your doctor or school confirming your ASD diagnosis or classification and 4th grade reading level, if available, back to us in the postage-paid return envelope provided.

   Once we receive the completed study forms from you, we will mail your $30 gift card of your choice no later than two days afterward, and we will enter your name in the raffle for a chance to win one of six VISA $100 gift cards.

In all, we think the study will take 60 minutes.

Are my forms and answers safe?
We will not tell anyone you are in the study. When we talk or write about the study, we will not use your name or anything that could single you out. We will only write or talk about the results from all the information put together. We will keep the answers and forms from the study for 7 years after we are done writing or talking about it.

Where will you keep my papers and answers?
Your name will only be on your consent form and developmental history form. They will be in a locked cabinet in a locked office. They will be in a different place from your answers and other papers. Your name will be blacked out on all the papers you give us. We will put your subject number on those papers (for example, 0001, 0002, 0003). Your answers will be on a secure computer. The computer will be in a locked office. Only research staff can open the cabinet or use the computer. Other people will not know which answers are yours. We will not be able to give you any of your information if you ask for it.

Are there any bad effects from the study?
We will ask you to answer a number of questions about yourself. It may be hard to pay attention after a while. We can do things to help you pay attention. For example, we can give you extra breaks. Also, you do not have to answer any question that you don't want to. You may quit the study at any time.

What do I do if I am upset about the study?
If you are worried or upset about the study, email Dr. David McIntosh at demcintosh@bsu.edu.

What do you get?
After you do the study, we will give you a $30 gift card of your choice. Also, we will put your name in a raffle for one of six $100 gift card. At the end of the study, we will randomly pick one person to win the gift card. The winner will get the gift card sent to their home address.

Do I have to be in the study?
Being in this study is up to you. You are free to quit the study at any time, for any reason. Please ask us any questions you have before you sign this consent form. Also ask us any questions you have during the study.

Who do I call if I have questions?
If you have questions about your rights as a research subject, please call or email the Director of Office of Research Integrity at (765) 285-5070 or irb@bsu.edu.

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Consent

I agree to be in this research study, entitled "Profile Analysis of the Personality Assessment Inventory – Adolescents with Adolescents with Autism Spectrum Disorder." The study was explained to me. I am happy with the answers to my questions. I have read about this study and agree to be in it. I know that I will get a copy of this informed consent form to keep.

_____ _____

Signature Date

Researcher Contact Information

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